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# MINNESOTA

1904

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# MINNESOTA

BRIEF SKETCHES
OF ITS

## HISTORY, RESOURCES AND OPPORTUNITIES

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NEW STATE CAPITOL, ST. PAUL.

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# HISTORY OF MINNESOTA.

By Warren Upham, Secretary of the Minnesota Historical Society.

If the hills and valleys of our state could answer to our questioning; if the sighing of its pine forests were a language; if its thousands of limpid lakes, flashing back the brightness of the sun, could reflect the scenes that have been mirrored in them; if its boundless prairies could repeat the story of their transformation from the roaming-ground of herds of bison into waving seas of grain; if the rich mines of iron ore at the north could tell of the persistent prospecting and the enterprise in railway building that unlocked their wealth; if we could hear such voices from the past, we should be thrilled with the romantic narrative of Minnesota, and our hearts would be deeply stirred with sympathy for the hardships and persevering courage of its people, and with admiration for their achievements.

Previous to the settlement of this area by white immigration, which may be said to have begun in 1849, when the Territory of Minnesota was organized, there were nearly two hundred years of gradually increasing knowledge of the geography of this state. During the first century, its explorers were French, chiefly led to this distant region for the profits of the fur trade. In the first half of the second century, after the British conquest of Canada, the explorers were English-speaking traders and travelers; and in its latter half, expeditions sent by the United States government to acquire information of the unsettled parts of the Northwest Territory and of the northern part of the Louisiana Purchase.

The entire history to be here briefly sketched is thus divisible into three parts: 1. The period of French exploration in Minnesota, from 1655 to 1763, the date of the cession of Canada to the English; 2. The period of English colonial and United States exploration, from 1763 to 1849; 3. The period of Minnesota's territorial and state development, from 1849 to 1904. The three periods together span two and a half centuries.

About a third of this state, lying east of the Mississippi and of a line drawn to the north from its head at Lake Itasca, belonged to the Northwest Territory, for which Congress enacted the Ordinance of 1787. The other two-thirds were acquired by the United States in the Louisiana Purchase, negotiated with the government of France under Napoleon, April 30, 1803.

## Early French Explorations.

The motto on our state seal, "L'Etoile du Nord," is a tribute to the memory of the French who first discovered and mapped Lake Superior, the upper part of the Mississippi, and the great region which

to-day forms our state of Minnesota. It recalls the time when New France stretched from Acadie and Quebec west to the sources of the Mississippi, and thence northwest to the Saskatchewan and south to the Gulf of Mexico, comprising, with somewhat vague boundaries, nearly half of this continent.

French pioneers of commerce and of Christian missions had made these regions known to the world and loyally claimed them as possessions of the crown of France, although their settlements and actual occupation of the country were limited, throughout the vast interior region, to widely separated trading posts and missions on the large lakes and rivers. The number of the French in Minnesota, and indeed along all the course of the Mississippi above New Orleans, and in all the region of the great lakes tributary to the St. Lawrence, was merely a handful in comparison with the thousands of the red aboriginal people.

After the discovery of the lower Mississippi by the ill-fated Spanish adventurer, De Soto, in 1541, a hundred and fourteen years passed before this river was next seen by Europeans. Then, in the year 1655 two hardy French explorers, Groseilliers and Radisson, appear, according to the narrative of the latter, to have crossed Wisconsin to the Mississippi, and to have voyaged up that river to the large island in Minnesota, called Prairie Island in translation of its old French name, on the west side of the main channel of the Mississippi above Lake Pepin, between the present sites of the cities of Red Wing and Hastings. There a year was spent with the Indians, of whom a large company from many tribes went in the summer of 1656 with these two Frenchmen on their return to Montreal and Quebec, carrying in their canoes a rich freight of furs.

During a second expedition three years later, in 1659-60, the same earliest pioneers of exploration in Minnesota, coming then by the way of Lake Superior, visited the wooded region of Mille Lacs, held a council with the representatives of many bands of the Sioux and Crees, and traveled with some of the Prairie Sioux to their villages and hunting grounds on the vast prairies of the Minnesota river.

On July 2,, 1679, twenty-four years after the first western expedition of Groseilliers and Radisson, another forerunner of the fur trade, Du Luth, visited the Isanti Sioux at their great village on Mille Lacs. In the autumn he held a council with the Sioux, Assiniboines, and other northern tribes, near the site of the present city of Duluth, for the purpose of inducing them to forsake their hereditary warfare, live in peace with each other, and collect furs for himself and other French traders.

Almost exactly a year later, about the first of July, 1680, Father Louis Hennepin, a Franciscan priest, and two other Frenchmen, who had been sent from the Illinois river up the Mississippi by the great explorer, La Salle, were the first white men to see the Falls of

St. Anthony, which Hennepin so named for his patron saint. This incident is the subject of the butter model which is shown in the state's dairy exhibit at the St. Louis Exposition. Their experiences on this expedition, being taken captive by a band of Sioux and rescued by Du Luth, form a most interesting narrative as told in varying versions by Hennepin, Du Luth, and La Salle. When the rescuing party and the former captives started back, they voyaged down the Mississippi to the Wisconsin river, and thence up that stream and over portages to Green Bay. For this journey the chief of the Isanti tribe traced the route on a paper and marked its portages, this being probably the earliest mapping of any part of Minnesota.

Three years afterward, in 1683, Le Sueur came to Lake Pepin and the Mississippi by this canoe route of the Wisconsin river, for fur trading; and at some time within the next few years he made a canoe trip of exploration up the Mississippi to the neighborhood of Sandy lake. In the spring of 1695 he established a trading post on Prairie Island; but in the summer he returned to Quebec, and thence the next year he sailed to France.

Le Sueur had discovered mineral wealth, as he erroneously thought, in a blue or green earth which the Sioux dug from the rock bluffs of the Blue Earth river a few miles from its junction with the Minnesota river, near Mankato. The Sioux used this earth as a paint, but Le Sueur thought it to be an ore of copper. He submitted the supposed ore to one of the king's assayers, secured a royal commission to mine it, and, after surmounting various obstacles, came over from France with a party of thirty miners, landing at Biloxi, near the mouth of the Mississippi, in December, 1699. He voyaged up the Mississippi, and spent the winter of 1700-1701 on the Blue Earth river, where he arrived the first day of October. A fort was built, and for the sustenance of the large company of miners, with French traders who came to them, and visiting savages, they hunted down and slaughtered four hundred buffaloes at the beginning of winter, and kept the meat frozen. In April, 1701, with the opening of spring, the miners took out fully 30,000 pounds of the supposed copper ore, of which, under Le Sueur's direction they selected four thousand pounds to be carried to the fort. This quantity was taken down the Mississippi and despatched to France, but no further record of it is known. Le Sueur at the same time sailed again to France, and died on his return voyage to Louisiana, or not long after his arrival.

The next and the last of the great French explorers of Minnesota during this period was Verendrye, who, in the year 1731 and onward, with his sons and a nephew, traversed the streams and lakes of our northern boundary. Fort St. Pierre, a trading post, was built at the mouth of Rainy lake, Fort St. Charles on the west side of the Lake of the Woods,

and other forts or trading posts on Lake Winnipeg and the Assiniboine and Saskatchewan rivers. Verendrye was the founder of the fur trade in the northern part of Minnesota, in Manitoba, and the Saskatchewan region, where it greatly flourished during the next hundred years; and two of his sons were the first white men to cross the great plains and reach the Rocky Mountains, in the winter of 1742-43.

## The Indian Tribes.

When the history of Minnesota began, in its relation to the white or Caucasian race, the tribes of the red or American race here occupied somewhat different areas from those which they had fifty years ago. Sioux and Crees then ranged through the northern wooded country between Lake Superior and the Red river, whence they were driven during the next century, the Sioux to the south and the Crees to the north, by the aggressive Ojibways or Chippewas, who had become first known to the French as the tribe of the Falls of St. Mary, at the mouth of Lake Superior.

About a hundred years after the first coming of white men, the Ojibways wrested Mille Lacs and the Rum river from the Sioux. Thenceforward these two peoples occupied all the area of this state, the Ojibways holding its northeastern wooded half, and the Sioux (who called themselves Dakotas) its prairie half on the southwest, until the land began to be taken for agriculture.

Soon after the massacre of the white settlers in the southwest part of Minnesota, in August, 1862, nearly all of the Sioux were driven westward into Dakota. The Ojibways at present number about 8,500 on their several reservations in the northern part of this state, being probably about as many as when formerly they owned all that northern country.

## The Second Century of Explorations.

La Salle, in 1682, having descended the Mississippi to its mouth, made there a ceremonious proclamation, giving all the basin of this great river to France. The vast territory so claimed he called Louisiana, in honor of the French king, Louis XIV. It comprised nearly all of Minnesota, excepting only the areas at the north tributary eastward to Lake Superior and the St. Lawrence, and northwestward to the Red river and Lake Winnipeg, which were otherwise added to the nominal possessions of France by the explorations of Du Luth and Verendrye. But these immense domains were lost by France in 1763, when her long war with Great Britain and the English colonies was terminated in a treaty at Paris. Canada and Louisiana west to the Mississippi were ceded to Great Britain, and the part of the Louisiana territory beyond the Mississippi was ceded to Spain. Thirty-seven years later, however, on October 1, 1800, Spain retroceded that area to France and it was purchased by the United States on April 30, 1803.

ST. PAUL, FROM WEST SIDE OF MISSISSIPPI.

After 1763, when France lost her American possessions, the extension and publication of geographic knowledge of Minnesota was carried forward chiefly by English-speaking explorers. The first of these was Captain Jonathan Carver, from the colony of Connecticut, who spent the winter of 1766-67 among the Sioux of the Minnesota river, near the site of the city of New Ulm. He had hoped to cross the continent to the Pacific ocean, but was prevented from advancing farther by lack of supplies.

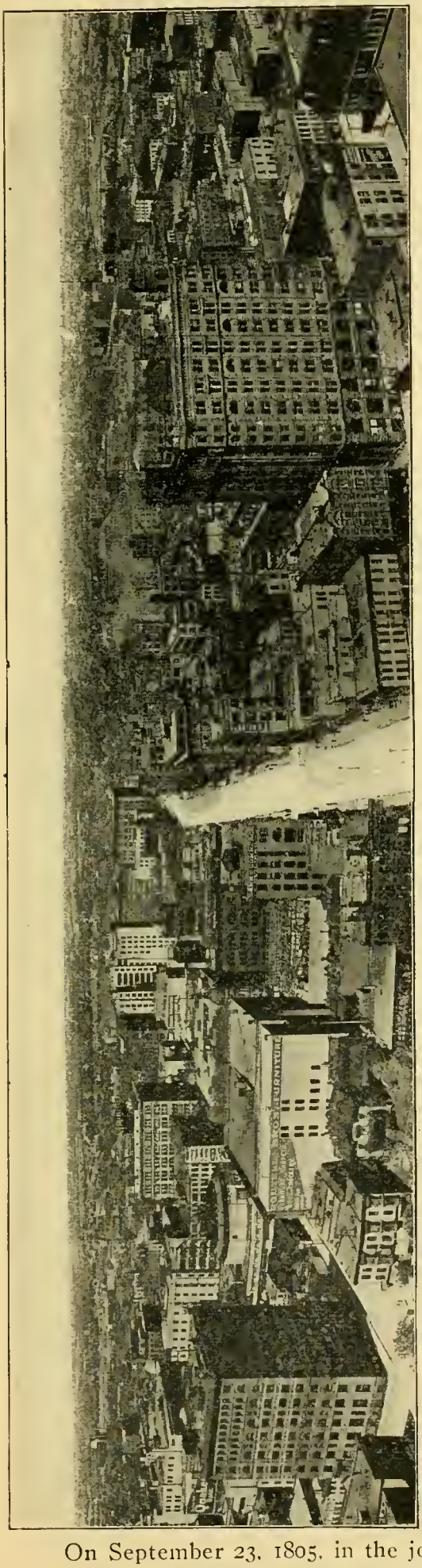
In his return east, Carver traveled with canoes along the north shore of Lake Superior, visiting Grand Portage, the most easterly and oldest town in Minnesota. Not long after Verendrye's explorations, Grand Portage became the landing place of fur traders and voyageurs on their long canoe route through the Great Lakes, Pigeon river, Rainy lake, and the Lake of the Woods, to the rich fur country of Lake Winnipeg and the Saskatchewan. It was already a very important outfitting post for the fur trade in 1767, when Carver was there.

Among the pioneers and explorers for the extension of the fur trade in northern Minnesota and also farther northwest during the next fifty years, four names stand forth most clearly to us, through their writings and records of surveys. These are Alexander Henry, the elder, as he may be termed in distinction from his nephew of the same name; Sir Alexander Mackenzie, the discoverer and explorer, in 1789, of the great river that bears his name; David Thompson, the surveyor; and the younger Alexander Henry. Few of the traders left any records, even in correspondence or note books; but some of them, as William Morrison, who in 1804 visited Lac la Biche (now Lake Itasca), made journeys and discoveries which would appear of great significance in the history of our state if we had narrations of their lives and work.

Until the United States in 1803 acquired the vast territory then called Louisiana, including the west half of the Mississippi basin, no government expedition was sent into the area of Minnesota. With that great expansion of our national domain, it became necessary to send explorers beyond the Mississippi, as Lewis and Clark, in 1804, to cross the upper Missouri region and the Rocky Mountains, and Pike, the next year, to the headwaters of the Mississippi.

Lieut. Zebulon M. Pike and his party of twenty soldiers started from St. Louis, on this expedition, August 9, 1805, in a keel boat seventy feet long, provisioned for four months. They ascended the Mississippi to the central part of Minnesota, where they were overtaken by early snow and cold, on October 16th, being therefore obliged to winter at Pike Rapids, in what is now Morrison county. The site of their stockaded encampment, or fort, has been identified there, on the west shore of the river, by Hon. Nathan Richardson, of Little Falls. The party relied largely

on the abundant game of the region for their sustenance. In the winter, setting out December 10th, Pike advanced afoot, with a few of his men, to Sandy, Leech, and Cass lakes, attained the objects of his expedition concerning the relations of the fur traders to the government of the United States, and returned to the fort at Pike Rapids on the fifth of March. Thence descending the Mississippi, he reached St. Louis on the last day of April, 1806. His very interesting journal gives our earliest detailed description of the upper Mississippi region above the mouth of Elk river, with many names of lakes and streams, and a definite view of the conditions then prevailing at the fur trading posts.



A PANORAMIC VIEW OF MINNEAPOLIS.
Reproduction of copyrighted panoramic picture eight feet in length by Sweet Bros., Minneapolis.

On September 23, 1805, in the journey up the Mississippi, Pike held a council with the Sioux on the

island since named for him at the mouth of the Minnesota river (then called St. Peter's river). In this council he acquired from the Sioux by a treaty, for military uses by the United States, a tract nine miles square, extending on both sides of the Mississippi from the Minnesota river to about a mile above the Falls of St. Anthony. In 1817 this tract was again examined by Major Stephen H. Long, and in 1819 to 1823 a fort was established at the junction of the Minnesota with the Mississippi. It was called Fort St. Anthony by its first commandant, Lieut. Col. Henry Leavenworth; but was named Fort Snelling in 1824, by Gen. Winfield Scott, in honor of the second commandant, Col. Josiah Snelling, under whose direction the fort had been mostly built.

May 10, 1823, the first steamboat, the Virginia, came up the Mississippi to the fort, beginning a traffic which gradually increased to its culmination in 1857, when 99 steamboats plied on this river, the aggregate number of their trips to St. Paul being 965.

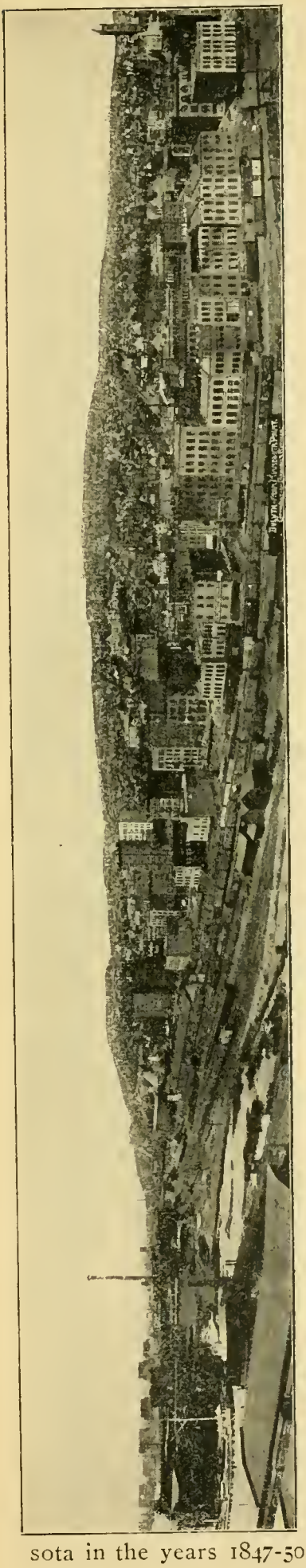
Scarcely was the fort completed, when in the summer of 1823 the most important expedition ever sent to explore this region for the United States government was made under the command of Major Long, who six years before had ascended the Mississippi to the Falls of St. Anthony. This expedition traversed the valleys of the Minnesota and Red rivers, to Lake Winnipeg, and returned east by the way of Winnipeg river, the Lake of the Woods, and Rainy river and lake, to the Canadian Fort William on Lake Superior. The geology of the route, and also the fauna and flora, were observed, with collection of specimens, by scientists, who accompanied Major Long; and a narrative of the expedition, in two volumes, published in 1825, was written by Prof. William H. Keating, the geologist, giving the first detailed information of the natural history of this state.

Beltrami, an Italian political exile, accompanied Long's party to Pembina, at the northwest corner of Minnesota. Thinking himself treated discourteously, he thence returned to Fort Snelling, with guidance by friendly Indians, but with no white companion and in part entirely alone. In this toilsome journey he was the earliest explorer (excepting the Canadian surveyor, David Thompson, in 1798) of the region of Red lake and the Turtle lakes and river, this being the most northern tributary of the Mississippi.

Three years before, in 1820, Gen. Lewis Cass had led an exploring expedition from Detroit, passing through lakes Huron and Superior, to Sandy lake, and thence up the Mississippi to the Upper Red Cedar lake, which was named by Henry R. Schoolcraft, the narrator of the expedition, Cass lake.

The highest source and head of the Mississippi, however, remained to be explored in 1832 by Schoolcraft, who gave to the beautiful lake there a curiously

coined name, Itasca, formed of two Latin words, Veritas, truth, and Caput, head, by omission of the first and last syllables.



DULUTH FROM MINNESOTA POINT.
Copyright, 1901, Crandall & Fletcher.

A few years later, in 1836, Lake Itasca was visited by Joseph Nicolas Nicollet, as a geographer for the United States, who also in 1838 traversed the southwest part of Minnesota to Lake Shetek and the Indian pipestone quarry. From his surveys and the information gathered by him from previous explorers and maps, Nicollet compiled a most admirably elaborate and accurate map of this northwestern country, including all the area of our state, when it had yet no white inhabitants, excepting at Fort Snelling, Grand Portage, and the few and scattered fur trading posts.

Other explorers and travelers during this period, who deserve mention, were G. W. Featherstonhaugh, an English geologist, who crossed southwestern Minnesota to the Coteau des Prairies in 1835; Lieut. Albert Lea, who was in southern Minnesota in 1836; George Catlin, the celebrated painter of Indian portraits, who visited the pipestone quarry in 1837; and the United States geologists, David Dale Owen, J. G. Norwood, and B. F. Shumard, who examined various parts of Minnesota in the years 1847-50, their report being published in 1852.

## Development as a Territory and State.

With the admission of Wisconsin to statehood, in May, 1848, the part of her former territory west of the St. Croix river was left without a government, as was also the large area west of the Mississippi which had been formerly included in Iowa territory. Therefore a convention of the people of these areas, held in Stillwater on Aug. 26, 1848, petitioned Congress for the organization of a new territory, to be named Minnesota.

This name, the Sioux designation of the largest river lying almost wholly inside our present state boundaries, means "whitish water," or, as may be said poetically, "sky-tinted water," in allusion to the whitishly turbid color of the river during flood stages. It was proposed by Gen. Henry H. Sibley, who on October 30th of the same year was elected as the delegate to Congress from the prospective territory.

On March 3, 1849, an act of Congress provided for the territorial government of Minnesota, which was organized and proclaimed June 1, 1849, by Gov. Alexander Ramsey. He had been appointed to this office by President Zachary Taylor, and was the territorial governor during four years. Gov. Willis A. Gorman succeeded him for another four years, and Gov. Samuel Medary for the next year, which was the last of the territory, Minnesota being admitted to the Union on May 11, 1858, as the thirty-second state.

The capital from the beginning was the village of St. Paul, which was first settled in 1838 to 1841, and was incorporated as a city on March 4, 1854.

St. Anthony was founded in 1840 to 1847, and became a city in 1855; Minneapolis, on the west side of the Mississippi, received its first settlers in 1849 to 1855, was incorporated as a town in 1856, and as a city in 1867; and these two cities were united under one city government in 1872, with the latter name.

In 1851 the legislature permanently located the three principal institutions of the territory and state, the capital to be in St. Paul, the university in St. Anthony (now the east part of Minneapolis), and the prison in Stillwater. The last named town was settled in 1841 to 1843, and was incorporated under a city charter on the same date as St. Paul, March 4, 1854.

Winona was founded in 1852, and received its city charter on March 6, 1857.

Duluth, which was platted and named in 1856 for the early fur trader and explorer of Lake Superior and northern Minnesota, remained long under a village government, being incorporated as a city in 1870.

Minnesota Territory had a population of 6,077 in 1850. Ten years later the state had 172,023 people; in 1870, 439,706; in 1880, 780,773; in 1890, 1,301,826; and in 1900, 1,751,394. At the present date, 1904, it has very nearly two million people. In the census of 1900, the population of its five largest cities, whose founding has been noticed, was as follows: Minneapolis, 202,718; St. Paul, 163,065; Duluth, 52,969; Winona, 19,714; and Stillwater, 12,318.

# MINNESOTA: ITS GEOGRAPHY AND GEOLOGY.

By C. W. Hall, Professor of Geography and Geology, State University.

As a unit of the North American continent, Minnesota is very central. As a commonwealth it is the northernmost of the United States, since it reaches 22.85 miles north of the 49th parallel, the great boundary meridian of the continent. Although not high above the sea, it still occupies an important place as we take into consideration the drainage of the continent. Three of the great river systems of North America have their sources within its borders. Flowing northward are the Red River of the North and the southerly branches of the Rainy river; flowing eastward is the St. Louis, the westernmost source of the St. Lawrence; southward pours the Mississippi. The area of the state is 84,286.53 square miles, or 53,943,379 acres. Of this area 5,637.53 square miles are water surface. This leaves room enough for more than 625,000 farms of 80 acres each.

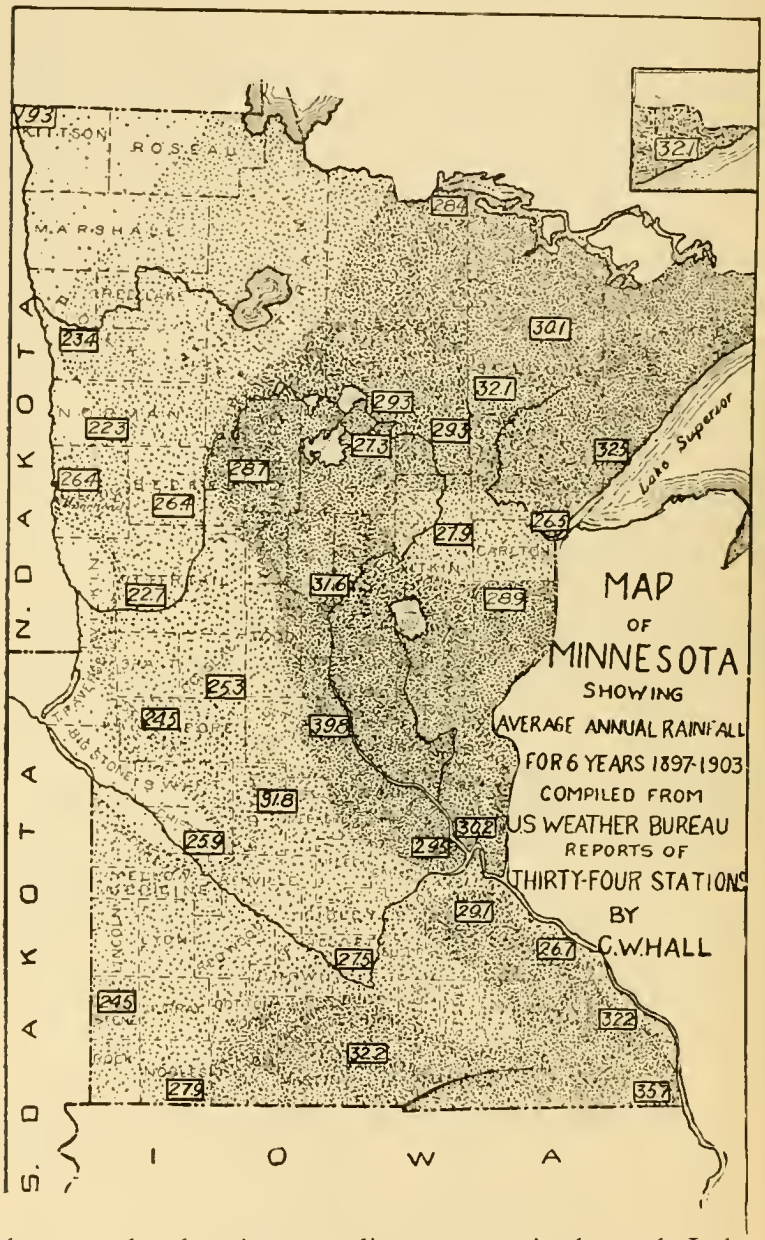
The relief of Minnesota is low. The highest summit stands only 2,230 feet above the sea, and the lowest levels 602 feet along the shore of Lake Superior. The average altitude is 1,200 feet. Indeed, 41,897 square miles stand above the 1,200-foot plane, and 42,390 square miles lie below this plane. From this it is seen that there can be but very little land so precipitous as to be unavailable for agriculture, and where the land is sterile that condition must be due to other factors than the presence of naked mountain slopes. Relief also shows that Minnesota is not peculiarly subject to floods. The long, low slopes will not gather water quickly into great volumes and roll it off readily, but on the other hand the thousands of lakes and far-stretching swamps will gather and furnish in slow delivery the volumes of water which fall in sudden rains or are formed by the rapid melting of the winter's accumulation of snow.

## Climate.

Minnesota climate is bright and sunny. The average of sunshiny days is more than 150 per year. Tower, in the midst of the iron mines, and in the highlands of the northeast, has 213 pleasant days yearly. Duluth can show more rainy days than any other city of the state. The rainfall for many years has averaged a little less than 30 inches for the entire state. There is a decrease in the quantity of rain as one traverses Minnesota from the east side to the west border and from the southeastern corner northwesterly to its contact with North Dakota and Manitoba. At Caledonia, in the southeastern corner, an average rainfall of over 33 inches gives assurance of constant crops of corn and grass, while a rainfall of near 20 inches at St. Vincent, diagonally opposite, yields sufficient moisture to mature the wheat, which is the principal crop of the northwestern region.

Snowfall is not heavy; but the quantity of snow varies considerably from year to year. For the southeastern part perhaps an average of 49 inches is a fair one; at all events, it is the record at Minneapolis since 1876. These figures show a precipitation a little less than Wisconsin and Michigan and considerably more than the Dakotas and Montana.

In matters of temperature, too, the record of Minnesota is most favorable. The average annual temperature is about 42 degrees, but were we to subdivide




the state by drawing two lines across it through Lake Mille Lacs, one north and south and the other east and west, we would find a temperature of nearly 44 degrees pervading the southeastern quarter and somewhat colder weather settling down upon the northwestern. That this is not a statement based upon recent reports is assured when it is said that the record runs back for more than 75 years, and shows that there has been a change of less than one degree as we compare the average temperature of the 25 years from 1823 to 1849 with the years from 1878 to the present time.

Minnesota lies between the two well-beaten tracks, the northern and the central, of the continental cy-

clones, which in ceaseless procession cross the continent from west to east. The winds are in consequence prevailingly westward. Owing to the comparatively low relief of its land surface, there are few local eddies or storms developed; but the procession moves steadily forward in its eastward course. The average force of the wind cannot be readily measured, but its average is not high. It is rare, indeed, that a velocity of 40 miles per hour is attained. The state lies so far to the north of the tornado tract of the Mississippi valley that these storms are comparatively rare. Only a few destructive ones are reported, and none of them north of the state's center, the latitude of Lake Mille Lacs. This is a climatic fact deserving wide mention.

## Prairie and Forest.

As to its plant population, the state exhibits two areas, that of the prairie and that of the forest. The former comprises 32,000 square miles and the latter 52,000. The former lies in the southern and western

LOGGING TRAIN.

portions and the latter in the central, northern and eastern portions. Upon the prairies have been developed cities, villages and farms at a much more rapid rate than in the forests, for the simple reason that upon them grain fields can be cultivated without the hard drudgery of felling primeval forests before the plow enters the ground. Rich prairie soil affords wonderfully fertile farms. Prairies are divisible into several types, according to their surface features and mode of origin. In the southern and southwestern districts, and locally elsewhere throughout the state, there are great rolling prairies, owing their characteristic feature to the morainic arrangement of the glacial drift over which they lie. Another type of prairies, seen in long and almost level stretches of the best farming lands, is to be found in the ancient lake bottoms scattered throughout the state. The soil is deep and rich and lasting. Farms upon these lake-bottom prairies show no exhaustion after a quarter of a century of constant cropping. Such prairies owe their origin to the extension of great sheets of water during

the retreat of glacial ice in the closing years of the ice age. While there are many of these tracts, two are especially worthy of mention. One is the bed of glacial Lake Undine, lying in Blue Earth, Brown and parts of neighboring counties, stretching from the Iowa line northward to the Minnesota river through the central southern portion of the state. The other is the great valley of the Red River of the North, the bed of glacial Lake Agassiz, described by Upham in Monograph XXV., U. S. Geol. Survey. A third type of prairies consists of the openings, as they are called, or level tracts devoid of trees, occurring frequently in the forested areas of the central and northern districts. These openings are the least important of the three different types. Prairies are becoming the centers of a somewhat dense agricultural population. A density of 30 to 40 to the square mile is already attained in some counties distinctively agricultural. There are also located upon them enterprising manufacturing centers and distributing points to meet the further demands of modern living. The prairies have proved remarkably incentive to progress throughout the state. A population map discloses the interesting fact that migration marks the lines of fertile prairies. Railroads follow them and a network of railroad tracks has been laid to gather up and take to the great consuming centers of the world the breadstuffs which the broad Minnesota prairie farms produce.

The forests of Minnesota proved to be the early incentive to settlement. While pre-territorial explorers pronounced the state worthless for anything save its lumber and as pasture grounds for the buffalo, lumbermen from the East, knowing well the vast wealth which lay in the streams tributary to the upper Mississippi, had in 1838 secured possession of the forests by treaties with the Indians. The lumber taken from the woods and floated down the streams was sawed and taken in rafts to southern cities. Later railroad trains have carried millions of feet to markets. From small beginnings an industry has grown until within the state are the two greatest lumber manufacturing centers of the continent, Minneapolis and Duluth. The business has proved a profitable one. It has been prosecuted with such superb energy that the pine timber of the forests has become in large measure removed. It is said that only seventy-five thousand million feet now remain standing. The pine forests of Michigan, Wisconsin and Minnesota contain the story of remarkable progress. Without the lumber which they have furnished, farmers could not have built the tens of thousands of comfortable and even luxurious farmer-homes within the prairie regions of Minnesota and her neighboring states. Whatever of rapid progress and successful control lies within the northern belt of states from the Great Lakes towards the Rocky Mountains, this is owed in no small degree to the forests. They have done noble

MINNEHAHA FALLS

service in the development of the West; what remains should be zealously guarded.

As the forests are removed and farms take their place, prairie tracts will be developed because of level surface and uniform soil. Now as the annual prairie fires are checked and the farmer plants his windbreak or becomes negligent of his fence areas, trees will grow upon the prairies. The timber culture act has done much towards foresting hundreds of acres of prairie land in southern Minnesota. It is an interesting question whether forests are being reduced in area or are advancing through the growth of protected trees over districts where, fifty and a hundred years ago, forest fires swept every tree from western and central Minnesota. Judicious treatment of forests will maintain a timber and fuel supply in the state for many future decades.

## The Soil.

The soil is the most important factor of civilization. Its quality determines more than does any other factor the physical activities, the industries and the moral and intellectual tone of a commonwealth. A knowledge of its character and capabilities enables a people to direct their energies into lines of highest success by removing vain effort to grow what is unnatural and strange. Within the soil lie the mineral foods of all plants, mingled with that decaying vegetable matter which returns to living organisms worn-out substances from earlier plant generations.

The mantle of rock waste in many states springs from underlying rocks; in Minnesota such is not the case. A mantle of glacial drift wholly covers the older formations, save in the southeastern corner of the state, where that unique tract of surface called the driftless area extends over the Mississippi from Wisconsin and Illinois into Minnesota and Iowa. This covering of drift, derived from many regions and made by the intermingling of many rock species, affords remarkable diversity in chemical components. In this respect Minnesota presents in the diverse quality of soil a diversity of crop possibilities rarely equaled and nowhere excelled within the United States. There are districts where sandstones and quartzites have left too large a proportion of their substance in the general glacial degradation of the rocks of the state; but such tracts are few and small. Limestones, shales and eruptive rocks have given a richer substance and a more enduring basis for permanent and fertile soil-building. Taking the entire area of the state into consideration, exclusive of its lakes, fully 90 per cent is arable land, a proportion rarely reached in all the states of the Union.

## Streams and Lakes.

Minnesota is drained by three river systems. One reaches the sea in Hudson Bay, another in the Gulf of St. Lawrence, and a third in the Gulf of Mexico.

In area the last is larger than both the others and comprises over 47,000 square miles. The system flowing northward, whose waters are carried to Hudson Bay by the Red River of the North and the Rainy river drains scarcely 30,000 square miles, while less than 7,000 square miles is the area drained through Lake Superior into the Gulf of St. Lawrence.

**St. Lawrence Drainage Basin.**—The St. Lawrence basin rests upon a datum plane 602 feet above the sea, and carries the water from the very highest portions of the state. The summits of the Misquah Hills are washed down through its many streamlets. The highest lakes of the state lie within this area. The entire region is thoroughly wooded, save where farmers have cut away the trees for making fields. The hills are rocky, sometimes precipitous, and everywhere old crystalline rocks are very near the surface.

The peculiar configuration of the ground in the northeastern portion of the state, where lie the head waters of the St. Lawrence, affords exceptionally favorable situations for lakes and unusual opportunities for the location of water power. The rock troughs afford long, narrow, lake-like expansions of

RED RIVER CART AND HALF-BREEDS.

the streams which, with but little expense in the construction of dams, can be made enormous reservoirs for water power. An illustration of possibilities in this direction is seen in the river St. Louis, which within a distance of five or six miles falls not less than 600 feet. With a drainage area of 5,000 square miles and numerous swamps and lakes scattered throughout its extent, the catchment basin of this stream affords a large and remarkably uniform rate of flow. This is already being utilized at Cloquet and Duluth, but thousands more men will find employment when the full capacity of the stream is harnessed. Eastward of Duluth, along the north shore, are the Temperance, Baptism, Poplar, Brule and Pigeon rivers, all certain to become of great importance. These streams are remarkable for their fish. Brook trout along the Lake Superior streams are remarkable both for size and numbers. The north shore of Lake Superior is fisherman's paradise.

**The Rainy River Basin.**—The Rainy river drains a region strikingly similar in many respects to that drained by the St. Lawrence. The descent of the

stream is not so precipitous. Rising in the same high lands as the St. Lawrence, that is, within tracts over 2,000 feet above the sea, it flows two or three times as far and leaves the state at 1,060 feet above the sea. The rocks over which it flows are extremely hard and it is only where some break in their continuity occurs that precipices are worn and waterfalls occur. But these develop, along the course of the stream, water power amounting to tens of thousands of horse power, so distributed that it is unusually steady and reliable. The lakes along the international boundary afford reservoir surface amounting to hundreds of square miles; narrow gorges at their outlets afford exceptional opportunity for building dams and impounding surplus waters. Rainy Lake, with its vast water power at International Falls, is a typical illustration of the commercial possibilities of this basin.

**The Red River of the North.**—This stream drains a different region. Its sources are among the forests; it carries the waters of many lakes through a beautiful succession of water surfaces and glens past Fergus Falls into the prairie level of the ancient floor of Lake Agassiz. Through this it meanders in a slow and sluggish stream nearly a thousand miles long between Minnesota and North Dakota, and finally leaves the state at 748 feet above the sea. This stream carries off the surplus waters of the great wheat garden of the world.

**The Mississippi Drainage Basin.**—This basin is a complex one. Its character is incident to the history of the river itself. As a stream, the Mississippi is divisible into three parts or subdivisions—a lower Mississippi, from Cairo to the Gulf; a middle Mississippi, from the mouth of the Ohio to the confluence of the Mississippi and Minnesota at Fort Snelling, a stretch of river whose banks are lofty rock walls carved out of ancient prairies; and an upper Mississippi, from Fort Snelling to Lake Itasca. These subdivisions are geographically sharply distinct. The last one, the upper Mississippi, is by far the youngest, and it represents the working of the river during the few thousand years from the close of the glacial period to the present. The river rises in a small yet beautiful lake and flows in an open channel almost upon the top of the glacial beds which form the superficial rock of Minnesota. It is so young, in other words, that it has not yet carved out a channel for itself, even in these soft and crumbling gravels of glacial time. The upper portion of the Mississippi from Fort Snelling to Lake Itasca forms a well defined drainage area of 20,225 square miles. It is largely wooded, yet here and there occur small opening-like prairies. The stream winds sinuously for hundreds of miles. It descends 774 feet, but little more than one foot to the mile throughout its length to Fort Snelling. Some of the largest lakes in the state lie within this basin. Lake Mille Lacs, for instance, has 201 square miles; Leech lake nearly 200,

and Cass lake over 100 square miles. The power along this stream is enormous; 30,000 horse power at Minneapolis, many thousands more at St. Cloud, Sauk Rapids, Little Falls and Pokegama Falls are only a part of the possibilities this stream affords. Much of it is navigable, thus affording a means of inland transportation of great value in the commercial development of the state. The principal use of the river as a transportation line has been the floating of logs. Billions of feet of pine have been rolled into its channel and carried by its current to mills, where every kind of lumber product has been manufactured. Its service for logging is not yet ended; much timber along its course has yet to be marketed for the material advancement of the great Northwest.

**The Saint Croix,** forming a part of her boundary line, drains over 3,000 square miles of Eastern Minnesota. This river has played an important part in the material development of the state. Its extensive pine forests were early entered, and they have yielded millions of feet for the lumber manufacturer.

**The Minnesota River** drains some 15,000 square miles of prairie land in Southern Minnesota. The Minnesota basin is as free from timber and is as typically a prairie region as the upper Mississippi basin is forested and free from prairie tracts. In this respect the two areas so nearly equal in size, in height above the sea, and in their broader physical features, are markedly different, and impress their differences upon the economic problems arising from their settlement and development. The ease with which farms can be broken and brought under cultivation explains why the Minnesota River valley is occupied by a much larger population than the upper Mississippi. This, like the upper Mississippi, is fortunately not a region of terrific floods. Records of destruction from flooded streams, either in the upper Mississippi or in the Minnesota drainage area, are remarkably rare.

The remaining portions of the state, draining southward and eastward, present the same general features as those just described. Among them the Vermillion at Hastings, the Cannon near Red Wing, the Zumbro and White Water, the Rolling Stone, the Root, and the Winnebago are the most important. The country is essentially one of prairie and not of forest, although along the Mississippi river the bottom lands are rich and the tree growth luxurious. Still this is a comparatively small area, which has never developed a characteristically forested region.

## The Minnesota Reservoirs.

The United States government has constructed, and is now maintaining, a system of reservoirs for impounding the waters about the sources of the Mississippi. These reservoirs constitute a unique and important feature of the economics of this stream. Their purpose is to maintain a more equable water volume. As they hold back the surplus of heavy

rains and melting snows, they minimize the danger of overflow and destruction. Navigation during the dry season is aided by a partial opening of the gates, and manufacturing interests can depend upon a more constant power than the natural flow would afford. The many centers of manufacturing activity developed and to be developed between Fort Snelling and Lake Itasca and the ever growing transportation interests receive great benefit from this wise policy of reservoiring the Mississippi river. The reservoirs already built and being maintained are as follows:

1.—Winnibigoshish reservoir, containing from 50 to 75 square miles of water surface.

2.—Leech Lake reservoir, 165 miles of surface.

3.—Pine River reservoir, raising the water in Cross, Pine, Dagget, Rush, Whitefish, Trout and Hay lakes. The area is large.

4.—Pokegama Lake reservoir, area about 10 square miles.

5.—Sandy River reservoir, area of Sandy lake and tributary waters, nine miles.

## The Lakes of Minnesota.

The lakes of Minnesota constitute one of the most interesting features of scenic beauty. Their use in cultivating love of the beautiful constitutes one of the highest elements in true education. There are many places from which one may see scores of lakes lying in different directions. Thousands of farmers' homes are located upon the shores of deep, clear lakes. They afford comfort to man and beast. But they are not evenly distributed. Certain portions of the state have comparatively few. The Red River valley shows a remarkably sparse distribution, because the valley itself is the bottom of a great lake, now disappeared from the earth. In southern Minnesota lakes are fewer than in northern, partly because southern Minnesota is geographically older than northern Minnesota. The surface features date back to the close of the ice age. In the west central portion of the state lies the famed Lake Park region of North America, where are thousands of lakes, varying from a half mile to many miles in length. All are glacial lakes and they owe their origin to physical movements developing glacial moraines.

Other lakes are in rock basins. Here are held the gathered waters until a point of overflow is reached upon the rim. An interesting feature of this type of rock-basin lake is the remarkable number of islands it may contain. Lake of the Woods, upon the border, carries thousands of islands. Some, to be sure, are mere rock masses standing up from the water. Rainy lake is said to contain 500 islands. Lake Saganaga, Basswood lake and others contain literally scores of these islands.

Step by step with the formation of lakes begins and goes forward the process of their deformation. Silt washes in, at times in enormous quantity; and many

forms of aquatic plants mature with remarkable vigor. In the shallower lakes this last obliterating process works with great rapidity. Already hundreds of lakes have disappeared and rich, productive hay meadows taken their place. On every hand are transition marshes and fruitful hay meadows. In many places farmers are accelerating these processes by draining.

## Some Geological Features of the State.

Passing now to that portion of Minnesota below ground, we find rocks everywhere in wonderful variety of physical characters. Some are so hard that the best steel tools make slow progress in cutting them. Others are so soft that they are crumbled by the fingers. They represent almost every phase of origin and change which the rocks of any region present. Some are the result of volcanic activity on a scale more magnificent than that now in evidence in the Hawaiian Islands or the West Indies. More than 6,000 square miles are underlaid with volcanic rocks and thousands of square miles more carry other rocks which tell of stupendous earth activity long geologic ages ago. These rocks, so far as they lie within the reach of the quarryman and the miner, stretch from the Minnesota River valley through Todd, Stearns and Morrison counties to Duluth, Hunter's Island and Lake of the Woods.

Thus we have in Todd, Morrison, Stearns, Sherburne and Benton counties and along the Minnesota river from New Ulm to Ortonville extensive masses of the best granite to be found in the United States, if a resistance against a pressure of 25,000 to 30,000 pounds per square inch signifies anything as to enduring qualities. Freshness and high quality exist at the very surface. Quarries have been opened at Ortonville, Granite Falls, Redwood Falls, Morton, St. Cloud, St. Joseph, Luxemburgh, Haven, East St. Cloud, Sauk Rapids, Sauk Center, Watab and others. There are hundreds of places more where not only excellent quality but admirable textural and color qualities can be secured; and passing to the northern portion of the state, where now are isolated rock masses, we find a region where hundreds more of quarry stations exist, from which an illimitable supply of building stones of almost every phase of granitic quality can be secured.

But towards the south and east are rocks made up of fragments of earlier ones. These, called fragmental or deposited rocks, are thousands of feet in thickness in the eastern and southern counties of the state. From Stillwater to Jefferson, from Mankato to Winona, from Minneapolis to Garden City, dolomites, limestones, shales and sandstones lie in endless quantity. Already the building stones from many quarries have become famous. Frontenac furnishes dolomite for stately buildings in lower New York, and Kasota for Philadelphia. In the local markets the bluffs of the Minnesota from Mankato to Shakopee

afford millions of yards each year, and the St. Croix valley walls at Taylor's Falls and Stillwater present inexhaustible supplies. The cities growing beside the Mississippi river never want for building material; the Twin Cities consume Trenton limestone; Red Wing is cutting down Barnbluff, and Winona has the crest of Sugarloaf almost removed.

Pipestone, Jasper and Luverne have paved many miles of Chicago streets. The quarries of sandstone of the Kettle river are in recent years affording a wonderful supply of one of the best sandstones the quarries of the United States afford. It competes sue-

COLUMNAR VOLCANIC ROCKS.
North Shore of Lake Superior.

cessfully with the famous Euclid stone, Waverly stone, and Berea stone of Northern Ohio.

Coming now to a later geologic age, we find here and there peculiar clays. For many years Mankato afforded a most excellent fire-clay for furnace linings and a large range of foundry uses. Goodhue county affords material for pottery of excellent quality; from its mining and molding has grown one of the largest manufactures of earthenware now operated in the

United States. The quality is excellent, the supply is enormous, and the industry is one of the most prosperous in the commonwealth.

The clay deposits within the state have proved of prime importance and of great value. Many centers of brick manufacture are already established, and more are undergoing rapid and healthful development. At Chaska and Shakopee years ago brick manufacturing was entered upon and has been continuously prosecuted. Thirty million brick are annually made, which find a ready market in all the business centers of the West. At Minneapolis the clays formed among the deposits in the flood plain of the Mississippi furnish 35 to 40 millions each year, with a steadily increasing output and correspondingly steady demand. At Wrenshall, a suburb of Duluth, 20 millions or more are yearly made out of the clay deposits in the bed of old Lake Duluth, a predecessor of Lake Superior. These clays were laid down upon the bottom of a quiet lake at the same time that its shores were rounding the pebbles and forming the sands which now make that boulevard, 475 feet above the lake, at once the beauty and pride of Duluth. At Moorhead, in the Red River valley, millions are made from the deposits of Lake Agassiz, one of the most remarkable features of glacial time, and whose history is peculiarly Minnesotan, since within this state its features were first studied, its shore lines first established and its history written by Warren Upham, a citizen of the state.

The clay beds just named are only examples of what occur in almost every portion of the state. There is not a county nor scarcely a township in which a large supply does not lie among the glacial deposits or the accumulations of decay as older rocks have yielded to the influences of time. Clay possesses a special interest in the present decade, since now we see the end of the great lumber industry, which has been so important for more than 50 years. Our pine trees are counted, the hardwood forests bought up and the plans for their marketing already perfected. As these building materials disappear men must go to the ground and seek that out of which to rear the walls of business structures and less assuming homes. Clay beds are appealed to. They yield a cheap and excellent supply. In Minnesota, where they are so extensive and accessible, they will be a growingly important factor.

But it is not from clays alone that substitutes for pine forests are to be found. St. Paul has set a commendable example in the utilization of what had been considered a worthless calcareous shale. Here an industry has grown up which produces millions yearly of excellent brick, architecturally the most attractive artificial building material made in the state. At Mankato and Austin are manufactories where extensive supplies of cement are made. Its quality is superior. The best commendation of the product is the steadily increasing output reported.

# AGRICULTURE.

By W. M. Hays, Professor of Agriculture, University of Minnesota.

The country life of Minnesota is peace loving, sturdy, industrious, thrifty and withal ready to make the most of the charms of this prettiest state, with its numerous lakes, its great rivers, its shores of the greatest inland sea, and its broad prairies, first emerald with green and then golden with grain. These crystal waters, as gems in their fair setting among the forest trees, or fringed with forests in the prairie land, making of Minnesota the Switzerland of America, are helping to mould the spirit of the country people. The love of home is made dearer by the trees and by the waters. As the great pioneer movement to the westward ceases, the family life clings more closely to the farm homes. There is a great, hopeful, resistless impulse on to gain for country life all that modern advancement makes possible. The free rural mail delivery, large rural schools, with vans in which to reach them over good roads, and state schools of agriculture and home economics, under the agricultural college, have all come in rapid succession. The enjoyment of a beautiful home life is giving the incentive for pretty farm houses and barns to match, all sheltered by beautiful groves.

## Three Great Agricultural Regions.

Minnesota is divided agriculturally into three great regions. The southern two-fifths was a great undulating prairie region, with a nearly uniform, rich, black, clay loam soil, and is now a region of homes snugly sheltered by planted trees. The northeastern two-fifths was timbered with alternating groves of pine and deciduous trees, and has soils of red, yellow black and boulder clays, with areas of sandy and peaty lands interspersed. The necessity of removing trees has retarded the settlement of this region, leaving until now lands at low prices for people who were not ready to secure prairie farms until after they were all sold. The northwestern one-fifth, formed by the debris deposited in a glacial lake, now called "Ancient Lake Agassiz," is widely known by the name of Red River Valley. Its surface is as level as a floor, and the thrifty farmers will soon have it all drained and covered with crops. Already most of it is dotted with groves containing comfortable homes, built up from the profits on wheat and live stock.

In all new sections of the middle northwestern prairies the pioneers from choice, from necessity and for the profits and quick returns, and for other good reasons, demanded of their fields a too continuous cropping to grain, which cannot be continued indefinitely. The pioneer system of field and farm management is only a temporary expediency. In the older regions the farmers early learned that not more than one-third of the land should be asked to produce grain for sale, the other two-thirds or more being used to produce crops fed to live stock, most

of the substance being returned in the form of fertility to keep up and even enrich the soils found so fertile in their virgin state. Gradually a system of permanent management is being wrought out. The grains, the grasses, including the common clovers; and the cultivated crops are being combined in rotations, with as many field divisions as there are years in the rotation, that there may be approximately the same acreage devoted to each crop each year. A new crop, as hardy alfalfa, occasionally comes forward, causing a change in the rotation plan. Steel wire fences have made it economical to fence each field, and since these fences may be so easily changed to new field lines, the farm may easily be reorganized so that the desired number of fields of a given size may be secured. The state and national governments are gathering detailed data as to the cost of growing each crop by many farmers who gladly co-operate with route statisticians who visit each farmer daily. Systems of farm management and of keeping accounts are being thus worked out by the agricultural col-

MINNESOTA FARM SCENE.

leges co-operating with the United States Department of Agriculture, that farmers may know which crops give the largest net profit per acre, and in which order of sequence they best grow in the rotation. The effort is to so arrange in the rotation those best paying crops that each crop has the land prepared for it by the preceding crop, and that the entire series of crops will be the most profitable and will build up rather than deplete the fertility of the soil. Rotation schemes which have been proven profitable at the Experiment Stations and on practical farms are as follows: (1) First year, wheat; second and third years, grass; fourth year, oats or barley; fifth year, corn. (2) First year, wheat; second, third, and fourth years, grass; fifth and sixth years, oats, barley, flax or wheat; seventh year, corn. (3) First year, grain; second and third years, grass; fourth year, corn; fifth year, grain; sixth year, corn. (4) First year, grain; second year, fodder corn; third and fourth years, grain; fifth year, corn; alfalfa on the sixth field lays six years and alternates with the five year rotation.

## Southern Minnesota.

The southern part of the state has so far passed through the pioneer stage of agricultural development that good buildings have been built, wells supply excellent water everywhere, orchards of hardy fruits are being developed and farm gardens are a part of every

country home. The business with field crops and with live stock has been well organized, though the enterprising people are still introducing new crops and new kinds of live stock. The farmers are more and more alert to improvements in the plan of managing the farm and in the introduction of new machinery. The improvement of live stock, corn and other crops by breeding them is one of the recognized industries. Every person who has seen the corn and clover belt of the upper Mississippi Valley, the greatest and richest agricultural region of the world, knows southern Minnesota. The climate is a little colder than northern Missouri, and its people have a larger portion of north European blood in the race-forming mixture. Hardier plants, hardier animals, snugger homes, broader and denser windbreaks, better barns and more constant sleighing make up the chief differences. The diversity of crops, the proportion of plant products made to go to market "on foot," and the amount of farmers' money in banks, are about the same as farther south. The transportation facilities, the markets, the schools and the churches excel. This region is settling down to making such large profits

TYPICAL FARM BUILDINGS ON MINNESOTA PRAIRIES.

on its present land valuations that prices are certain to rise, making investment here more promising than in some older regions where prices have gone nearer the productive capacity of the soils.

## The Great Pine Woods.

Two-fifths of Minnesota, lying in the central and northeastern portions of the state, were covered with deciduous and coniferous forests, magnificent in character and area, and most valuable in economic quality. The woodsman has skimmed off the cream, so far as lumber is concerned, but he has uncovered vast areas of land for farm homes. Here remains one of the regions where the homeseeker with limited means can still find lands at a low price. The state and nation are taking steps to show him how to judge in selecting only the good soils for farming, that the sandy lands best suited to leave for growing pine may be managed by the state, that future generations may

have crops of lumber. The great areas of clay lands in the timbered areas, most of which bore "hardwood" timber, are to-day selling farther below their real value than the lands on the borders of the semi-arid regions, where the rainfall is deficient, or than some of the lands of the corn belt, where prices have soared above the prices possible for the poor man to pay. The peaty soils also have a value, especially where they may serve as meadow or pasture lands adjacent to the clay lands under the plow. While the work of clearing the new farm year by year is tedious, yet the owner can look forward to a very large increase in the selling prices of his land. This region remains

MINNESOTA PINE.

the one place where the man can "grow up with the country." While the children are coming to maturity and the farm is being equipped, the mere increase in value of the land will be a very good profit, and will form a comfortable "estate" to leave. The world has not yet found a better place to raise a strong race of boys and girls than in the rapidly developing pioneer home, on land sufficiently rich in productive capacity to provide means with which to send the nearly mature youth away for a goodly period at high school and college.

## Northwestern Minnesota.

The valley of the Red River of the North, forming the northwestern fifth of the state, is famous be-

TYPICAL BARN AND GRAIN STACKS.

cause of its level floor of the blackest, richest, deepest, most enduring soil which contains almost centuries of wheat crops of a quality which makes Minneapolis famous for her brands of flour. Here, Nature, in one of her colder moods, used a great ice sheet with which to paint upon the surface of a lake-bed a layer of rich soil, not rivaled by any unless it be in the valley of the Nile, where Nature each year adds a new silt layer of soil a little richer than that spread on before. This wheat valley, this adopted home of flax, this region where the cow and the wheat produce bread and butter in ample proportions; this land is producing farm homes and protecting them by planted groves. The northern races are here adding to the stature they brought from the old world; and their mental girth has been expanded by this free soil, by the schools for farmers, by the periodicals under free mail, and by the impulse of wealth and opportunities, so that they think in terms not only of the country, the state and the nation, but they are in touch with the pulsations of world affairs. Wheat and flax, aided by the cow and the plants to feed her, are bringing riches to this region, and people who make homes in the north are developing that same affection for their homes that is realized by the home makers of the sunny Southland. Cheap, long distance transportation for concentrated dairy products, made chiefly in winter, with labor which is required in summer by the grain crops, co-operative creameries and cheese factories, which take from the housewife the burdens of the dairy, form combinations of farm industries which not only give profits, but result in building ideal homes and a beautiful country life. The rugged statesmen, the able business and professional men, the stalwart farmers and the superb mothers

A MINNESOTA CORN FIELD.

MINNESOTA FARM SCENE.

being produced by this region forecast its great and prosperous future. The shortness of the cropping season, the low temperatures of winter, are difficulties that do not enervate. The people, compelled to work rapidly in summer to take fullest advantage of the short crop season with very long days of brightest sunshine, and impelled by cold winter to remain active, have the habit of being alert. Overcoming the difficulties is making of them a strong people. Greatness in athletics, in business, in professions and in public service awaits the race which wrestles with rugged nature, as proof of which follow the Scot and the New Englander. The processes of breeding hardy races of men, plants and animals suited to this region are already operating. Institutions for education and research have already become recognized agencies of greatest power in this valley, and they are but yet in their infancy. Here, where the real land values are still much above selling prices, the young

HYBRIDIZING WHEAT.

farmer may go with assurance that the richest soils will be an enduring foundation for a lucrative farm business and an ever secure support for a well organized country home life.

## Statistics of Farm and Country Life.

Minnesota had 1,751,394 people in 1900; 22.1 on each of her 79,205 square miles of territory; an increase of over 40,000 annually since 1870; and now doubtless has between 1,900,000 and 2,000,000. Half of these people live on the 154,659 farms. These farms aggregate 18,442,585 acres of improved land, 82.7 per cent of which is farmed by the owners, 14 per cent by share tenants and 3.3 per cent by tenants paying cash rent, while mortgage sales are very rare. Of these improved acres nearly two-thirds are in grains, more than one-third producing hard, red, spring wheat. The average farm contains 169.7 acres, of which 119.3 are improved and 50.4 are unimproved. The farms average in value

$5,100, of which $713 is in the buildings. Land may be purchased at $1.25 to $125, owing to quality and market facilities. For each farm there are 1.7 workers or one worker to each 100 acres of farm, or of 70 acres of improved land. The product is $827 per farm, $517 per worker; a grand total plant and animal product of $161,217,304. In 1899, with farm property worth 789 millions of dollars, of which 559 millions was land, 110 millions buildings, 89 millions live stock, and 30 millions implements and machinery, Minnesota produced 161 millions of dollars worth of products, of which 33 millions were fed to animals and 128 millions were not fed on the farm. Her animal products were 45½ millions, her crop products 113 millions and her forest products 2½ millions. This state has 1,751,394 people living on farms, 258,944 of whom are agricultural workers, of whom only 6,815 are women, each

HYBRIDIZING FLAX.

worker caring for 71.2 acres of improved land. There are 152,393 farm homes, about 83 per cent of which are owned and 17 per cent rented. The average value per farm is $5,100, or $3,000 per agricultural worker; while the average annual product per farm is $827, and the average value produced per worker is $495.

## Societies, Departments and Publications.

Agriculture is being promoted in Minnesota by various general agencies. An excellent system of farmers' institutes, or traveling farmers' schools, has done a wonderful work in the past eighteen years and is a growing influence. Scores of meetings of a week or less in duration are held annually in the larger towns. Specialists instruct and interest men and women in seeking all available information concerning the farm and the farm home. The farmers' institute annual is a bound book of several hundred pages,

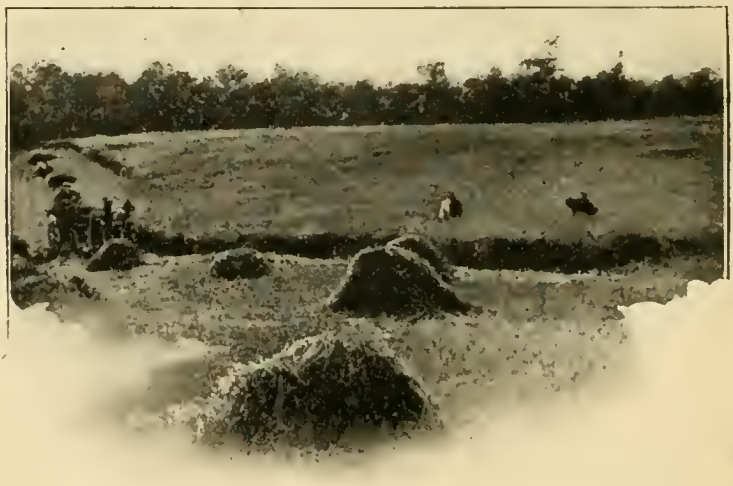
treating of country affairs, and through distribution from the institute platform it is added annually to twenty thousand libraries in farm homes. The State Agricultural Society conducts the largest state fair on the continent, its annual receipts being over $160,000. It holds an annual winter meeting, the proceedings of

HARVEST SCENE.

which are published in an annual report; and at this meeting is held a competitive exhibit of field seeds. The State Horticultural Society has an active membership of over 1,400, the largest society of its kind in America. It publishes a monthly journal and an

NEW HYBRID WHEAT.

annual report, and many of its members assist the horticultural division of the experiment station in testing and improving horticultural crops. That such a society is possible in a climate so far north illustrates two important facts. The people are energetic in overcoming difficulties, and they are actually succeeding in adapting fruits to the climatic conditions in spite of cold temperatures in winter. The State Dairy Association has a large place in Minnesota agriculture and is closely associated with the dairy division of the State Experiment Station and the State Dairy Commission. These three agencies, all of which issue reports, have most forcefully illustrated the fact that a great industry may be powerfully promoted by voluntary organizations and by state departments. The co-operative creameries and cheese factories, better cows, superior shipping facilities for dairy products, improved meth-



TIMOTHY AND CLOVER, NEAR PRINCETON.
Cut 4½ Tons Per Acre.

ods of feeding and breeding dairy cattle, modern ways of caring for milk, so as to relieve the farmer's wife, have all been materially promoted by these agencies, and the state is in the front ranks of dairy production, both as to quantity and quality. The Minnesota Improved Live Stock Breeders' Association has recently begun most important work in promoting the breeding of pedigreed animals. One or more meetings are held annually and an annual report is issued. The Minnesota Field Crop Breeders' Association has been recently organized by the breeders and growers of seed corn, seeds of the small grains, and seed clovers and other forage crops. Many of its members are cooperating with the agricultural division of the Experiment Station in the breeding of field seeds, and in bringing into general commercial use newly bred varieties which yield more value per acre. The Minnesota Forestry Association is coming out victor in a long continued struggle to secure state and national control of part of such lands as are better suited to

WINNEBAGO VALLEY, SOUTHERN MINNESOTA.

forest crops than to general agriculture. The Minnesota Farmers' Club is a young organization of all who have attended the Agricultural High School, and has a county organization in most counties. It is becoming a power, as is also the Alumni Association of the School of Agriculture. This last named organization publishes a most excellent agricultural paper. The beekeepers have a good organization, as do also the buttermakers, the promoters of good roads and others interested in minor lines of agricultural advancement.

Besides the two agricultural papers named above, published by societies, there are several strong agricultural periodicals published in the state. The farmers' institutes and other agencies devoted to building up agriculture have greatly promoted subscriptions to farm papers. The fact that these papers are sent by the hundred thousand to subscribers in Minnesota attests to their excellent character and to the intelligent enterprise of our farmers.

# LIVE STOCK IN MINNESOTA.

By Prof. Thos. Shaw, Editor *The Farmer*, St. Paul.

Previous to the middle of the last century nearly all of Minnesota was uninhabited except by some tribes of Indians who sought a precarious livelihood by hunting over its prairies and in its forests and supplementing the products of the chase by fishing in its rivers and lakes. In but few of the magnificent counties even of southern Minnesota had a furrow been turned with a plow. The gopher made his burrow in the prairies and the coyote sought his prey practically unscared. These facts should not be lost sight of by those who study the condition of live stock at the present time in Minnesota.

## Influences Adverse to Live Stock Production.

During the earlier decades of settlement in Minnesota, but little attention was given to the growing of live stock. Certain influences operated against the industry and greatly retarded its progress. Chief among these were the following:—First, the effort of the settlers was to grow grain only and principally wheat. They obtained their lands chiefly as homesteads. They laid open the bosom of the prairie with the plow, sowed and reaped and sold, and bought more land though laboring not more than half the year. Why should they worry about live stock, they were always ready to answer, when they could obtain a competence thus easy. Second, many of the early settlers were men who knew but little about agriculture when they settled on their lands. It was comparatively easy to learn to grow wheat on virgin soils. It was more complex to learn to grow live stock. They naturally did what was easy to do. Even to this day on areas of more recent settlement, farmers are pursuing precisely the same methods, and, judging by the past, many of them will continue to do so, until compelled to grow live stock as others were in older settlements because of waning fertility and the advent of certain insect and parasitic troubles which preyed upon the wheat. It is not surprising, therefore, that under such conditions, in 1880, only 23 years ago, there were only 934,595 cattle in the state, only 257,282 horses and only 267,598 sheep and 381,415 swine. In 1850 the number of cattle in the state was 2,002, horses 860, sheep 80, and swine 734. In 1900 the cattle numbered 1,305,331, the horses 650,965, the sheep 359,328 and the swine 1,440,806. These figures are taken from the United States census returns for 1900. Later statistics that are reliable relating to agriculture have not been published, a fact that is not creditable to Minnesota.

## Conditions Favorable to Live Stock Production

The writer has stated once and again the conviction that the day is not far distant when Minnesota will stand high, if not indeed first, in the production of live stock and live stock products among all the states

of the Union. This statement is made in full knowledge of the fact that the farmers of the favored corn belt will incredulously smile when they read it. The reasons for this faith will now be given. They rest upon conditions that relate to soil, food products, water supplies, climate and marketing facilities.

**Soil.** Much of the soil of Minnesota is possessed of an amazing fertility. Particularly is this true of nearly all the soil covering the natural prairie, and about half of the state is natural prairie. In the portion covered by forest the soil is not so uniformly good, but much of it is excellent there also. On Minnesota soils as many as 25 crops of wheat have been grown in succession, nearly all of which have been large and without the application of a pound of fertilizer. In the Red River Valley, soil taken from the

A FIELD OF RYE.
At Minnesota Experiment Station.

depth of 80 feet below the surface has been found capable of producing and maintaining an abundant production. The state embraces a wide range of soils, nearly all of which are easy of tillage, and this in part explains why so great a variety of food products can be grown as is mentioned below.

**Food Products.** In addition to wheat, which is frequently fed to live stock because of its abundance, our state grows magnificently all the other small cereal grains, as oats, barley, rye, speltz, flax and in much of the state Canada field peas. In the flax crop it stands second, and in the oat crop fifth among the states. Properly tilled, its lands will always stand high relatively in the abundance of the yields in small cereals, owing to the favorable climatic conditions. The hot waves which sometimes blast the prospects

of the husbandman further south are almost entirely absent in Minnesota.

In fodder production no state is the peer of Minnesota. As much fodder corn may usually be grown on an acre of land in Kittson county, bordering on Manitoba, as can be grown on a similar area in Iowa. As much sorghum may be grown on an acre of Minnesota soil as may be obtained from an acre of Louisiana soil. Minnesota is a paradise for growing grain in mixtures for fodder uses or to be fed as succotash.

The natural adaptation of both soil and climate for hay production is excellent. Timothy will grow well in all parts of the state and the same is true of Russian brome grass. Clover will grow successfully in nearly all parts of the state. In all the northern half of the same, east of the Red River Valley, it grows like a weed. By simply scattering the seed it will grow up abundantly in land covered with brush, where the shade is not too dense. The writer has seen common red clover 7½ feet high, which grew thus among the brush. Even Indiana, the great clover state of the Union, falls below this region in natural adaptation for growing clover. Large fields of alfalfa are now being grown in various areas, and there are good reasons for believing that soon alfalfa will be grown more or less in every county of the state. Millet in nearly all its forms produces excellent crops of hay and grain, the yields of which in many instances, are phenomenally large. The state has uncommon adaptation for growing pumpkins and squashes, and in the southern half of the same some varieties of cow peas and soy beans will mature their seeds in an average season.

Much of the state has high adaptation for the production of pastures. Blue grass will flourish on every foot of arable land in the state. The same is true of Russian brome grass and of winter rye grown for pasture or for the grain. All the good kinds of clover, as the medium red, the mammoth, the alsike and the small white, can be grown in pastures and usually in the same pastures. Redtop grows magnificently on all the lower lands. Timothy is found in nearly all sown pastures, and even meadow fescue and tall oat grass will do well in areas in Minnesota.

Field roots of all kinds can be grown in Minnesota, as rutabagas, turnips, mangels and carrots. For the growth of mangels and carrots the adaptation is exceptionally high. Potatoes also grow so well that they are frequently so plentiful as to justify feeding them to live stock, hence, in all parts of the state, the stockman can supplement dry fodders where ensilage is not fed, with those kinds of food which have done so much to make the live stock of Ontario so famous. Ensilage also may be made and used to any extent that the growers may desire.

Mill foods also should always be more cheap and abundant in Minnesota than in any other state in the Union, since more of these are manufactured in our state than in any other. Minneapolis is the greatest

center for the manufacture of the by-products of wheat in the world, and it is also the greatest center for the manufacture and distribution of other kinds of ground food for live stock. The Minnesota farmer, being nearer to the base of these supplies than others, can procure them more cheaply. The Minnesota dairyman who feeds those products, such as bran, shorts and coarse grains ground, or the by-products of these, has a very decided advantage over the Massachusetts dairyman who buys and feeds the same. The same line of reasoning will apply to the growing of beef and pork, and also of mutton from the screenings so plentiful in that milling center.

**Water Supplies.** Everybody knows the close relation between water supplies abundant and pure, and successful live stock production. The latter cannot be where the former is not, and this statement applies most of all to successful dairying. On some of the western ranges the grasses are never eaten closely because good water has not yet been obtained in sufficient quantities on these. Minnesota is famous for her water supplies. That she is deservedly so will be at once apparent when it is estimated that 10,000 lakes are within her borders. True, many of these are small, not much more than ponds, but it is also true that several of these are miles in diameter and many of them are much larger than a good sized farm. In the aggregate they cover 3,608,012 acres of the entire area of the state. Rivers and streams are numerous, and in almost every part of the state water can be obtained in unfailing supply by sinking wells to a reasonable distance below the surface. The character of the water is also of the best; were it not so, Minnesota could never have attained that enviable position which she now occupies in dairy production.

**Climate.** The abundant food products and the illimitable supplies of food would not in themselves avail to place Minnesota in the front rank to which she is coming as a live stock producing state, were these not supplemented with a favorable climate. The air of Minnesota is so pure that malarial diseases cannot live within her borders. When persons shaking with ague migrate to this state, they shake no more. This statement will excite no wonder when it is mentioned in this connection that there are hundreds if not thousands of bodies of water within the state that have no visible outlet. Malarial disease germs cannot emanate from these in the presence of air so pure. True, the climate is cold in winter, but it is a steady and a dry cold. Because of this, live stock are always ready and eager for their food, a condition essential to the most profitable kinds of live stock production. The amount of sunshine in winter is in a sense proverbial, hence it is that live stock in Minnesota fatten more profitably in winter in yards with shed protection than in stables and tied in the stall. The steady character of the winter weather and the sunshine give the Minnesota feeder a decided advan-

tage in winter over feeders in the more changeable winter weather further south.

**Market Conditions.** No state is more happily situated with relation to markets for live stock or live stock products. Three great and growing cities are within her borders, that is, St. Paul, Minneapolis and Duluth. These will always be great consuming centers. At South St. Paul are stockyards larger in area than those in Chicago, and with a rapidly increasing volume of trade. More than twenty lines of railroads carry commerce through the state, some of them being trans-continental lines. The market facilities, therefore, for live stock, could scarcely be better. Are there not good reasons for the faith that Minnesota will yet stand high, if not indeed first, in the production of live stock and live stock products among all the states in the Union?

## The Dairy Industry.

The cattle industry in the state is two-fold, embracing dairying and beef production. The former is at the present time the much more important industry of the two and so it is likely to remain. This is owing

TYPICAL MINNESOTA PRAIRIE FARMSTEAD HOME.

first, to the delusive belief long cherished that beef could not be profitably made in a state in such close proximity to the western ranges, a delusion that was rather fostered than dispelled by erroneous teaching in earlier years on the part of some who posed as guardians of public thought in this line. Second, to the natural tastes of the settlers. A very large number of these are of Scandinavian and German origin, hence they have come from countries where much more attention is given to dairying than to meat production. Third, the returns from dairying are relatively large and they come in through all the year. It would probably be correct to say that the dairy industry has done more for the farmers of the state than any other line of live stock production, and it is by far the largest and most important industry in this line.

The United States census gives the milch cows in the state in 1850 as 607, in 1860 as 40,344, in 1870 as 121,467, in 1880 as 225,545, in 1890 as 593,908 and in 1900 as 753,632. The increase in the number of the milch cows therefore has been rapid and continuous. In the Ninth Biennial Report of the State Dairy and

Food Commission, published in 1902, the number of cows furnishing milk to creameries, not including cheese factories, was, in 1901, 382,356. It is thus apparent, therefore, that the milk from about one-half the cows in the state is sent to the creamery. Sometimes the separating is done on the farms, at other times at skimming stations, and yet again it is separated at the creamery. It is well that so large a proportion of the butter is made at creameries, as the average quality of the same is much higher than when made on the farm.

The extension of the creamery business has been marked during recent years. In 1899 the number of creameries in the state was 582. In 1901 it had increased to 681. Of these 526 were conducted on the co-operative plan and 155 were owned privately. The value of the creamery butter in 1899 was about $9,000,000. In 1901 it had increased to $13,909,897. The quality of the butter ranks high in the markets of the continent and brings top prices. It is not surprising, therefore, that Minnesota should have scored more victories at leading fairs during recent years for high class butter than any other state in the Union. Butter from this state won a medal at the world's fair held in Paris in 1900.

The prosperous condition of the dairy industry in the state is not accidental. Some of the causes have been given. In addition to these, it may be said that the natural conditions for dairying are of the best and the industry has been greatly fostered by instructions given at the School of Agriculture and on the Farmers' Institute platforms. Instruction is given in home dairying at the former to both men and women. A special course is also conducted in dairying at which instruction is given relating to work as conducted in creameries and cheese factories. At the various farmers' institutes held from year to year, a relatively large proportion of the time occupied by speakers has pertained to dairy matters and these discussions have been supplemented by demonstration work in dairying, as, for instance, churning and testing milk on the institute platforms. The State Dairy and Food Commission, liberally supported by the legislature of the state, have also sent traveling instructors into the field, who in the creamery or the cheese factory have given help to those who may have needed it.

While the natural conditions for cheese production are unexcelled on the continent, the cheese industry has not greatly extended. In 1902 there were but 54 cheddar cheese factories in the state. According to United States census returns, the manufacture of cheese had fallen from 676,642 pounds in 1890 to 290,623 pounds in 1900. There are good reasons for believing that the industry has materially advanced since 1900, but even now there is not one cheese factory in the state for every ten that it could sustain without interfering in any way with the making of butter. The principal reason for the backward condition of the cheese industry is that it has not been pushed, being

overshadowed by the creamery industry. Even the latter, large and prosperous as it is, can be greatly extended. While Minnesota has a land surface of 53,335,367 acres, only 19,000,000, or a little more than a third of the same, has been improved.

## The Beef Cattle Industry.

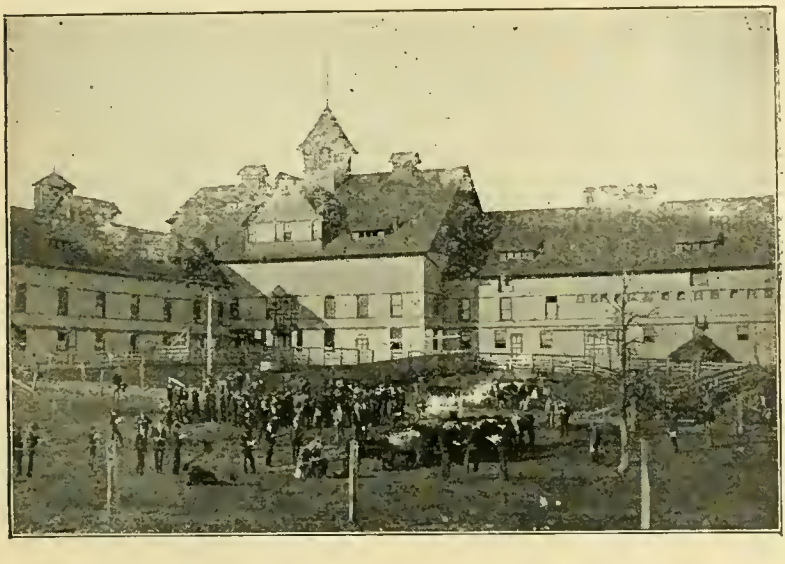
The beef cattle industry is only in its infancy. In 1900 the total number of cattle in the state was 2,624,957, including dairy cows, and excluding these it was 1,871,325. There is no means of knowing how many cattle are fattened in the state, for the reason that no reliable statistics are gathered on the subject. But it is certainly small compared with what it may be and will be in coming years. The magnificent adaptation of the state for this industry finds illustration in the long line of food products grown as outlined above. The adaptation of the climatic conditions is equally high. In the state of Illinois an experiment is in progress intended to show the farmers how much they lose by allowing their beef cattle to wade in the mud during

MINNESOTA CATTLE.

soft weather in the winter and spring. States in the distinctive corn belt generally are watching this experiment with much approval and interest, since the outcome will apply to their conditions. The results of this experiment will prove of little value to the farmers of Minnesota, since, happily, in our state there is of necessity little or no mud at the seasons mentioned. The steady winter climate excludes it. The appetite of the animals is always good, hence the average gains of beef cattle that are being finished for the block must be greater in our state than those of cattle similarly fed in the areas just referred to. The fattening can be done as well and better in open sheds with sunny and protected yards, than when the animals are tied in stalls, as has been demonstrated at the State Experimental Station, thus reducing the fattening problem to a very simple one. The magnificent natural adaptation of Minnesota to the production of beef cattle has been clearly demonstrated by the great victories won in show rings by animals from the herds

of H. F. Brown of Minneapolis, N. P. Clark, St. Cloud, and others, with Minnesota bred animals, though competing against the world.

Minnesota is happily situated with reference to the supplies of cattle for fattening. These will come from two sources. First, the animals will be grown upon the farms. They will come from the cows of dual types, that is, cows good for both meat and milk production. The milk of those cows will be separated and fed to their calves, the cream being manufactured into butter at the creamery or at home. These calves, while growing up to the fattening period, will turn coarse foods, which could not in any other way be so well utilized, into meat, and when sufficiently grown these animals will be finished on the farms and sent to the block under 30 months of age and at weights of 1,200 to 1,400 pounds. This class of cows is becoming greatly popular in the state, and this method of growing beef is finding much favor. This method of



STUDENTS AT THE SCHOOL OF AGRICULTURE JUDGING CATTLE.

growing beef will soon remove what has been a stigma on live stock production in the state. Many of the farmers who kept cows sold their calves at one year or younger to ranchmen, who took them out to western ranges to be grown on these. In fact this practice was generally prevalent during the closing decade of 1900. It meant that the Minnesota farmer sold what, if kept on the farm and grown as outlined above, would have become to him an important source of revenue. Happily this folly is materially growing less in the state.

Second, cattle grown on the ranges are shipped in immense numbers every autumn to the stockyards of South St. Paul. These are usually not prime for the block. This means that farmers can easily secure stockers for winter fattening, which they can usually feed at a good profit in the winter on foods chiefly grown on the farm. Experiments at the state station have shown that such cattle have practically doubled in value during a period of five to six months' feeding. The door of opportunity that is thus opened to the

farmers is literally without limit. This, therefore, may become and is likely to become one of the most gigantic industries in the state. When that better day arrives, the immense flax crop of the state, 90 per cent of which is now shipped to Europe to be fed to cattle which finally compete with ours in European markets, will be fed in Minnesota.

## The Horse Industry.

It cannot be said of Minnesota that she has become a noted center for the breeding of horses. She is not famous, for instance, as Kentucky is, for producing trotters, and yet Minnesota has bred many good trotters. She is not as famous as Illinois and Ontario, for instance, for breeding heavy draughts, and yet, some of the best studs of draught horses in the Union, Clydes, Shires, Percheron and other types, are found in Minnesota. The same is true of coachers and some other classes. From Minnesota studs, notably that of N. P. Clark, St. Cloud, home grown horses have won highest honors at the most famous shows of America, facts which bear on the high natural adaptation of the state for such production. The want of high natural adaptation to any line of live stock in Minnesota has never been an obstacle in the way of its extension. Our want is rather that of men who will center their energies on live stock production rather than on the never ending growing of grain which is being sold from off the farms.

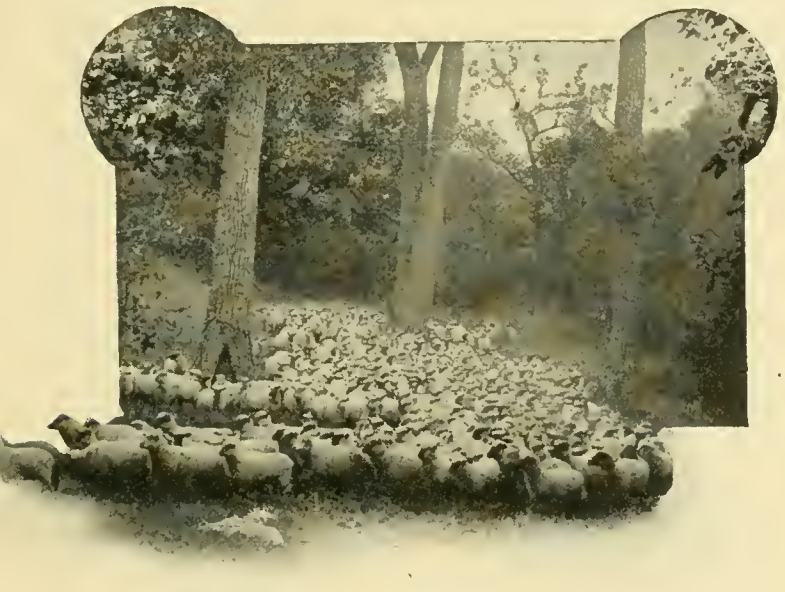
The horse industry has made steady and continuous progress in the state. In 1890 the horses numbered 593,908. In 1900 the number had increased to 650,965. The supply of horses, therefore, is not more than will meet the needs of the state at the present time. Assuming that it has increased considerably it would mean that on the average there are only about five horses kept on each Minnesota farm. The field, therefore, for breeding horses in Minnesota, especially draught horses, is as large as the farmers of the present or the future may desire to make it.

The facilities are also at hand for the fattening of horses and for otherwise preparing them for the markets, as is done in places farther east. They can be secured in any numbers that may be desired from the ranges. Many range grown horses come across the state on the way to eastern markets. In no state is food more abundant for putting these in condition for the market, and in no state are the climatic conditions more favorable to such feeding and otherwise preparing those animals for future work.

## The Sheep Industry.

Sheep husbandry has never been given a tithe of the attention in the state which its importance demands. However, the increase in the numbers of sheep kept was gradual and continuous until, say 1890. At that time there were 399,049 sheep in the state. In 1900 the number had fallen to 359,328, that is to say, at that time there was only one sheep in the state

for every 148 acres of land surface in the same. In other words, the number of the sheep in the state in 1900 could have been multiplied by ten and still it would have been entirely too few to crop down the weeds even that grew in by-places on the arable farms of the state. According to the legislative manual compiled for the legislature of 1903, the number of sheep in 1902 had increased to 600,000. The figures look suspicious, as, although sheep are rapidly increasing in the state, it is not probable that the increase is so great as these figures would indicate. Granting that they are correct, it means that at the beginning of 1903 there was but one sheep in Minnesota to every 88 acres of land surface, and this in a state pre-eminently adapted to sheep husbandry. The decline in the sheep industry during the last decade—1890-1900—followed congressional legislation soon after the national election in the autumn of 1892, and was doubtless a direct result of the same.



COMING HOME FROM RAPE FIELDS, WESTERN MINNESOTA.

It has been stated that Minnesota is pre-eminently adapted to sheep husbandry. This would be self-evident to any one who understands the requirements of sheep husbandry and the way these are met in our state. Sheep require undulating land—undulating land covers more than three-fourths of the state. It calls for a soil free from stagnant water—much more than three-fourths of the soil in the state is of this character. It wants a bright winter climate—a brighter winter climate than ours can be found in but few places on the continent. It demands good and varied pastures—these are present within all our borders. The rape pastures of Minnesota are becoming proverbial—from ten to fifteen head can be fattened for the market on every acre of these in the autumn when properly grown. It asks for varied food products in the line of fodders, grains and roots—no state can furnish these in greater variety.

The high adaptation of the state to sheep husbandry has been amply demonstrated at the State Experiment

Station. For several seasons in succession at that station, during the last decade, an average of ten sheep and lambs were pastured during all the grazing season on one acre of land. A similar number was maintained in winter from the product grown on a like area. Some seasons there was food enough to spare both from the summer grazing and the winter feeding The pastures were sown and embraced, along with some grass, winter rye, oats and barley, Dwarf Essex rape, corn, sorghum and cabbages. The winter food consisted of hay, mixed grains, corn, sorghum and field roots. The said station also demonstrated beyond the possibility of a doubt, the high quality of the mutton that can be grown. In 1901 and also in 1902 it sent down each year a pen of five lambs grown on the farm to compete against the world at the Chicago international show, and with the result, that both seasons it brought home champion honors. In 1901 the lambs won first place both alive and dead, a victory in mutton production that was never equalled before or since by sheep at this great show.

The introduction of the rape plant into Minnesota bids fair to revolutionize sheep husbandry in the state. Many farmers sow rape along with the small cereal grains. They use about two pounds of seed per acre. Usually the rape plants grow slowly amid the grain and without injuring it until harvest time. After the grain has been harvested, unless the season is unfavorable, the rape plants grow vigorously and furnish a large amount of fine grazing for sheep per acre. Some farmers, especially in the southern part of the state sow rape in much of their small grain and then fatten sheep in the autumn on the rape, purchasing them at the stockyards of South St. Paul or on the ranges of the west.

The door of opportunity for finishing sheep on the farms of the state in winter stands wide open. Sheep grown on the ranges of the west are shipped to stockyards to be sold as stockers, or for immediate slaughter. The major portion of these are not in a high condition of finish, hence the wisdom of carrying them from the stockyards to the farms and giving them that finish that commands good prices. Hundreds of thousands of sheep come into the South St. Paul stockyards every year. At the present time many of these are fattened at the stockyards, but when they are much of the fertility made is lost, whereas if the fattening were done on the farms, the fertilizer made would be applied on these, the coarse foods of the farm would be manufactured into a more condensed product and at a profit of say fifty cents to $1.50 per head, according to the conditions. Two lots of sheep could thus be fattened in succession each winter on a Minnesota farm.

The conditions for fattening sheep in winter are superlatively good. Reference has been made to the wide range of foods that may be grown. In addition to these, wheat screenings in enormous quantities re-

sult from the cleaning of the wheat at the elevators. These alone, with hay, make an excellent fattening food. In this way much of the screenings grown further west find their way into Minnesota to be sold to feeders. In the dry, bright winter climate of the state, sheep feed in perfect comfort with only the protection of a shed. The feeding process is exceedingly simple. The fodder given does not need to be cut nor does the grain need to be ground. At the Minnesota Experiment Station gains as high as twelve pounds a month have resulted from such feeding. The number of sheep that may be thus fed on farms in winter is almost without limit.

The room for the expansion of this profitable industry is very great. In 1903 the number of farms in the state was 155,000. Now suppose that but ten head of sheep were introduced onto each farm, a number insufficient to graze down the food that now goes to waste on these during the summer season, it would mean that these farms would sustain 1,550,000 sheep without any cost to the farmer for food in the summer season. Again, take the 8,000,000 acres of land owned by farmers that is not yet improved. Devote it to sheep husbandry on the lines indicated in the practice of the State Experiment Station. It would mean that 40,000,000 sheep could be sustained on this land, or two-thirds as many as are now kept in all the United States.

## The Swine Industry.

In 1890 the swine in the state numbered 853,715. In 1900 this number had increased to 1,440,806. The development of the industry therefore during recent years has been rapid. The bulk of the swine grown at present are found in the southern half of the state, but their growth in the northern half is extending rapidly. There is no part of the state in which the swine industry may not be made to flourish and happily no state in the Union is better adapted to the growth of both the lard and bacon types within its own borders. It is to be questioned if any other state is so well adapted for this dual line of work.

The growing of corn in Minnesota is rapidly extending. In 1901 there were planted 1,361,120 acres. The yield was 35,797,456 bushels. Within a few years the average of corn will be more than doubled, it is increasing so rapidly. It has been found that the wheat or other grain crop following corn yields from 20 to 33 per cent more, even though the land has not been manured previously to the growing of the corn. The benefit results chiefly from the influence which the cultivation of the corn crop has upon the cleaning of the land and also upon the density of the same. The benefit thus resulting to the grain crop is in itself resulting in a rapid increase in the growth of corn. This, in conjunction with the increase in food which it furnishes, must result in a great increase in the lard types of swine for the growing of which corn is the principal food factor.

MANITOBA
LAKE OF THE WOODS
RED LAKE INDIAN RESERVATION
WHITE EARTH INDIAN RESERVATION
LEECH LAKE IND. RES.
WINNIBIGOSHISH IND. RES.
CHIPPEWA IND. RES.
Longitude West from Greenwich.
Minneapolis
St. Paul
Duluth
Fargo
Grand Forks
Moorhead
Crookston
Thief River Falls
Bemidji
Brainerd
Detroit
Wadena
Otter Tail
Fergus Falls
Alexandria
Morris
Benson
Willmar
Litchfield
Redwood Falls
Marshall
Watertown
Aberdeen
Sioux Falls
Pipestone
Worthington
Jackson
Fairmont
Mankato
Owatonna
Rochester
Winona
Red River
Mississippi River
Minnesota River
Rainy River
Lake Traverse
Big Stone Lake
Lake Benton
Lake Winnibigoshish
Leech Lake
Red Lake
Upper Red Lake
Lower Red Lake
Cass Lake
Park Rapids
Hubbard
Walker
Akeley
Nevis
Laporte
Remer
Pine River
Backus
Longville
Pequot Lakes
Jenkins
Crosby
Ironton
Emily
Brainerd
Crow Wing
Fort Ripley
Little Falls
Pierz
Royalton
Buckman
Motley
Staples
Wadena
Sebeka
Menahga
Verndale
Hewitt
Park Rapids
Nevis
Akeley
Hackensack
Walker
Laporte
Remer
Pine River
Backus
Longville
Pequot Lakes
Jenkins
Crosby
Ironton
Emily
Brainerd
Crow Wing
Fort Ripley
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Royalton
Buckman
Motley
Staples
Wadena
Sebeka
Menahga
Verndale
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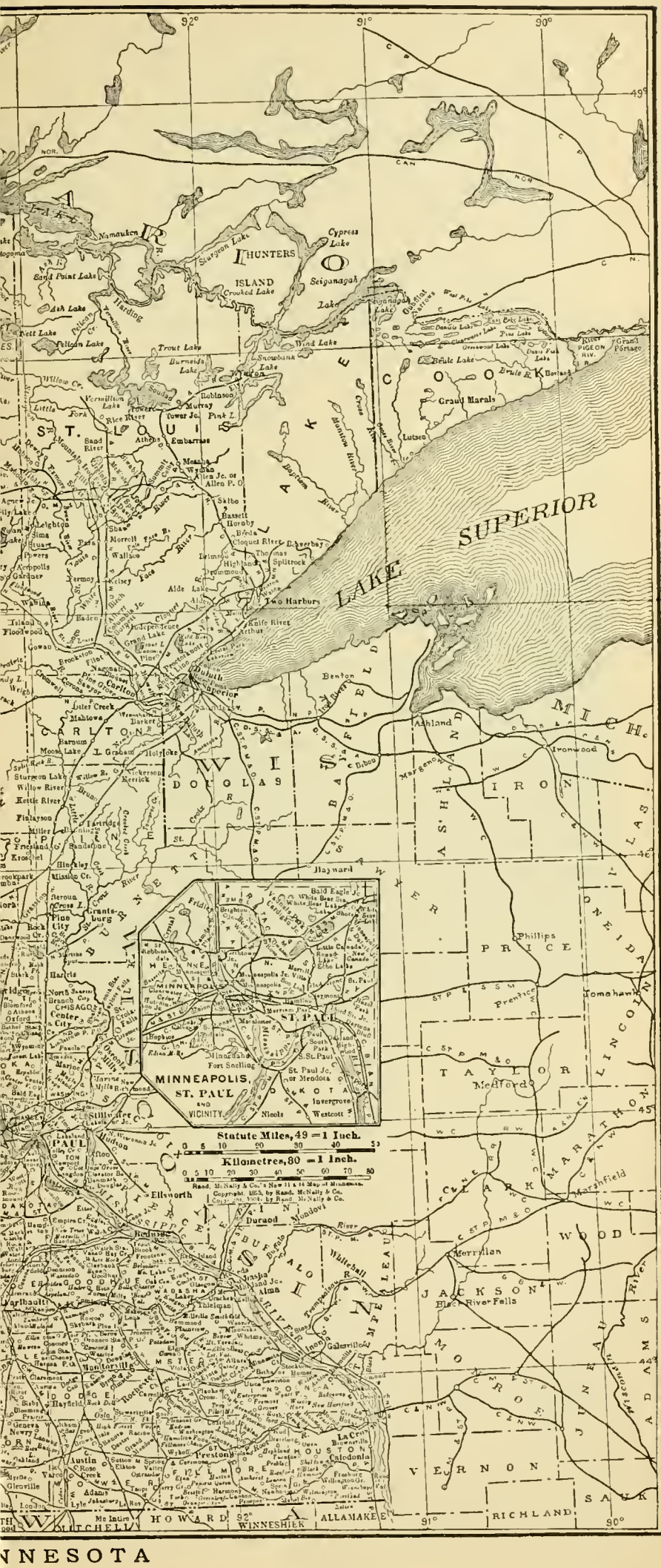
Brainerd
Crow Wing
Fort Ripley
Little Falls
Pierz
Royalton
Buckman
Motley
Staples
Wadena
Sebeka
Menahga
Verndale
Hewitt

MAP OF


92°
91°
90°
49°
45°
44°
SUPERIOR
LAKE
MINNEAPOLIS,
ST. PAUL
AND
VICINITY
Statute Miles, 49 = 1 Inch.
Kilometres, 80 = 1 Inch.
Rand, McNally & Co.'s New 11 x 14 Map of Minnesota.
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HUNTERS
ISLAND
Namakan
Crooked Lake
Sturgeon Lake
Cypress Lake
Seiganagah
Lake
Sand Point Lake
Ash Lake
Kett Lake
Pelican Lake
Trout Lake
Wind Lake
Snowbank Lake
Vermilion Lake
Rice River
Sand River
Athens
Embarrass
Robinson
Murray
Pine L.
Tower Jc.
Meadowlands
Wrenshall
Allen Jc. or Allen P. O.
Saginaw
Bassett
Hornby
Breda
Cloquet River
Thomas
Splitrock
Highland
Drummond
Alden
Lake
Two Harbors
Knife River
Arthur
Duluth
Superior
Benton
Ashland
Ironwood
Hayward
Phillips
PRICE
Tomahawk
TAYLOR
Medford
Marshfield
WOOD
Merrillan
JACKSON
Black River Falls
VERNON
SAUK
RICHLAND
Ellsworth
Durand
Alma
Galesville
Caledonia
Preston
Austin
Rose Creek
Adams
Le Roy
Glenville
Albert Lea
Mc Intire
HOWARD
WINNESHIEK
ALLAMAKEE
DOUGLAS
CARLTON
IRON
LINCOLN
MARATHON
ADAMS
JUNEAU
MONROE
CLARK
BUFFALO
TREMPEALEAU
HOUSTON
FILLMORE
MOWER
DODGE
GOODHUE
WABASHA
WINONA
OLMSTED
MINNESOTA
WISCONSIN
MICHIGAN
Grand Marais
Lutsen
Grand Portage
Brule L.
Brule R.
Baptism River
Manitou River
Cross River
Temperance River
Poplar R.
Bois Brule R.
Nemadji R.
Black R.
Flambeau R.
Chippewa R.
Mississippi R.
Wisconsin R.
Buffalo R.
Whitehall
Trempealeau R.
Root R.
Zumbro R.
Cannon R.
Straight R.
Whitewater R.
Rush R.
Kinnickinnic R.
St. Croix R.
Willow R.
Kettle River
Pine City
Harris
North Branch
CHISAGO
Center City
Lindstrom
Taylors Falls
Stillwater
Lakeland
Hudson
Prescott
Red Wing
Lake City
Wabasha
Winona
Rochester
Stewartville
Chatfield
Spring Valley
Preston
Caledonia
Houston
Lanesboro
Fountain
Harmony
Spring Grove
Hokah
La Crescent
Brownsville
Winneshiek
Decorah
Waukon
Postville
Lansing
Ossian
Calmar
Fort Atkinson
Monona
Cresco
Mabel
Canton
Fillmore
Rushford
Peterson
Houston
Caledonia
Preston
Harmony
Spring Grove
Hokah
La Crescent
Brownsville
Winneshiek
Decorah
Waukon
Postville
Lansing
Ossian
Calmar
Fort Atkinson
Monona
Cresco
Mabel
Canton
Fillmore
Rushford
Peterson

NNESOTA

In the northern half of the state, the adaptation for the growing of swine of the bacon types is of the best. In 1901 the barley crop of Minnesota was 21,680,617 bushels and the oat crop 65,734,027 bushels. Nearly two million bushels of winter rye were grown and large quantities of speltz. These foods in conjunction with skim milk and field roots which grow so well and yield so enormously in the state, are exactly adapted to the growing of bacon, as is also shorts manufactured in endless quantities in conjunction with the grinding of wheat. A succession of summer pastures for swine may be grown in great luxuriance, such as clover, alfalfa, rye, barley, rape, sorghum, peas and sweet corn. There can be no question, therefore, that Minnesota in the near future will be quite as famous for the production of bacon as she is now for the production of butter. All the conditions that have made Ontario so famous for the production of bacon are present in at least equal degree in Minnesota.

Disease is never likely to affect swine so much in Minnesota as in the states of the distinctive corn belt, owing first, to the greater variety of the food grown even in the best corn growing sections of Minnesota, and, second, to the greater inherent stamina possessed by the bacon types of swine. Hog cholera does not prevail to any great extent in the state. If the farmers would cease to bring in swine from states further south, it could soon be entirely obliterated. As it is, the losses from this source are insignificant compared with the losses in other states. The outlook for great development of the swine industry in the near future and in all the future is very bright.

## Great Field for Growing Pedigreed Stock.

In the judgment of the writer no state in all the Union furnishes so promising a field for the growing of pedigreed live stock. The best thing probably that could happen to the live stock industry of the state would be the establishment of hundreds of additional studs, herds and flocks of pure bred animals within its borders. The demand for the same within the state is rapidly increasing, and it is going to increase for decades to come.

Then there is the demand from states and ranches further west. As regularly as the seasons come and go, ranchmen from the west cross Minnesota in search of pedigreed males. They take back car loads of these every year. They scour the states further east for sires to be placed in their studs, to be used in their herds and to head their flocks. Many car loads are bought every year, even in Ontario, and they go right across Minnesota on the way to the range country. There are no reasons why a large proportion of these animals should not be grown in this state. Ranchmen would not go beyond Minnesota for the purchase of those stocks if Minnesota could furnish them. It ought to furnish them. The natural conditions of climate, food and water for growing them are all here,

and of the best, as has already been shown. In more than one-half of the state are groves to furnish shade and winter protection, and in the other portions windbreaks can be grown to be quite effective in keeping the winter winds at bay in half a dozen years. The state has still more timber for building uses than probably any east of the Rocky mountains, and other building materials as stone, sand and lime, are plentiful in all the grove and forest country, and also in many sections of the prairie. During recent years many within the state have begun to breed purebreds, but still the number is only a tittle of what it ought to be.

Nothing has been said about the production of fowls, an industry that is assuming very large proportions, although it is still only in its beginnings. In

A NEW KIND OF MILLET.
Minnesota Experiment Station.

1900 the chickens in the state numbered 7,730,940, the ducks 127,635, the geese 90,975, the turkeys 193,143, and the eggs produced were 43,208,130 dozens. Nor has anything been said about goats, which are now being rapidly introduced to assist in clearing the brush away from the millions of acres of cut-over and uncleared lands in northern Minnesota, lands much of which when cleared are as good for the production of grass and many other kinds of crop as the sun ever rose and set upon. Are there not good reasons for the statement previously made, that Minnesota will yet stand high, if not indeed first, in the production of live stock and live stock products among all the states in the Union?

MINNESOTA STATE FAIR GROUNDS, HAMLINE, MINN.

# MINNESOTA AS A HORTICULTURAL STATE.

By Samuel B. Green, Professor of Horticulture, University of Minnesota.

## Horticultural Education.

The Minnesota State Horticultural Society is one of the most vigorous organizations in the state and one of the largest, if not the largest, horticultural society in the United States. It had a paid membership of 1,430 in the year 1903. It publishes its report as a monthly magazine with a total issue of about 500 pages yearly, and has ten volunteer experiment stations which report to it. These stations are affiliated with the central experiment station, which supplies them with material for experiment purposes. It pays out $350 in premiums at its two annual meetings, and

ORCHARDING IN MINNESOTA.
(After Jewell Nursery Co., Lake City.)

always brings out a large display of fruits and flowers. It is making special efforts to encourage the growing of apple seedlings, believing that the apple growing interests of this section will be very much improved by the introduction of new seedlings, and it is not uncommon to have 300 seedling varieties of apples at the annual exhibition. It has a standing offer of $1,000 for a hardy, late-keeping apple adapted to this section. In a general way, it looks after the horticultural interests of the state. For further particulars, address the secretary, A. W. Latham, Minneapolis.

The Minnesota State Agricultural Society offers liberal premiums at its annual exhibition, and thus draws out a magnificent collection of fruit, flowers and vegetables. For displaying this exhibit, a large, modern exposition building is provided, 160x240 feet in size, and over $1,400 are offered in premiums for fruits and

flowers and $3,150 for vegetables, grains and grasses. This exhibition lasts for six days, and it is a very potent factor in the education of our people as to the possibilities of horticulture in this section.

The Central Experiment Station and School of Agriculture conducts experiments and gives instruction in horticulture and forestry, as well as in other agricultural branches, and much interest is taken in these subjects. About 700 students were registered in the Agricultural Department of the State University for the year ending June, 1904.

## Fruit Growing.

The climate of Minnesota is well adapted to the growing of all the fruits of the Northern States, except for a few very cold days sprinkled through our otherwise comfortable winters. The summers are equable, and killing frost seldom occurs in the south-

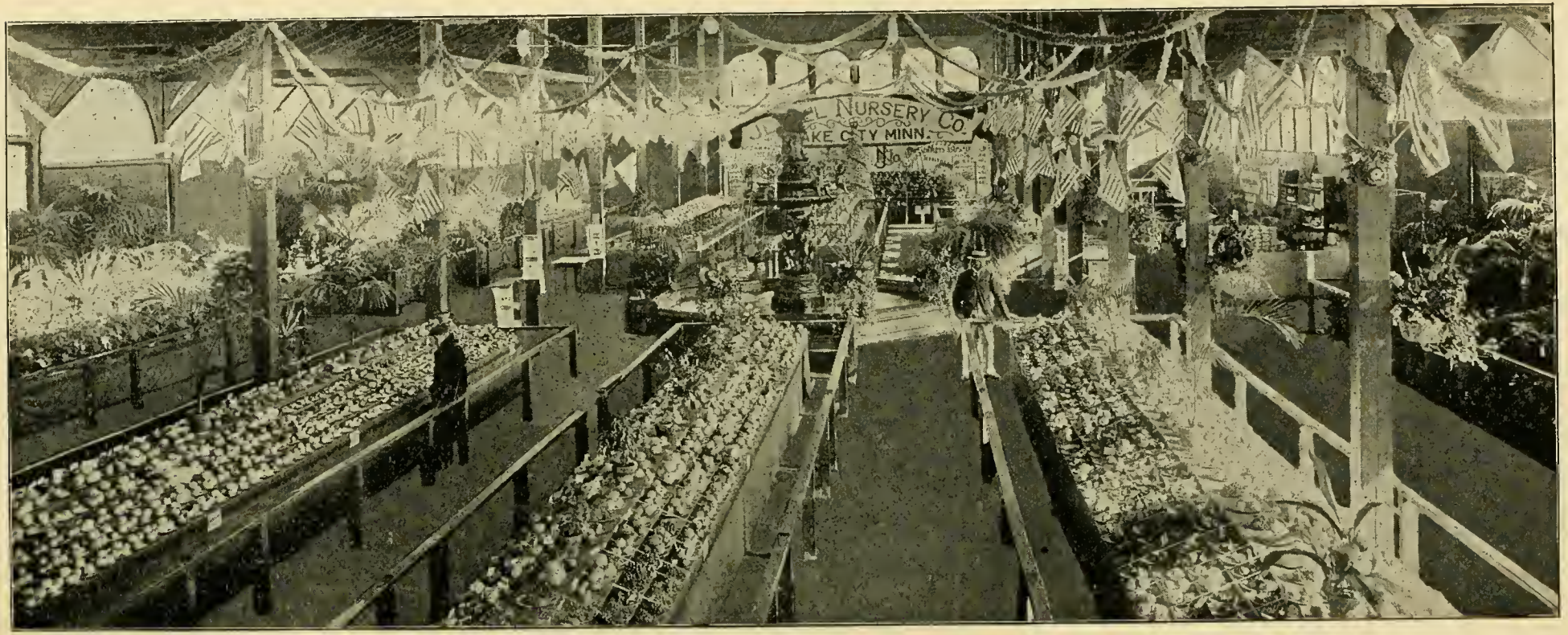
ORCHARDING IN MINNESOTA.

ern portion until the latter part of September, and in some years not until the middle of October.

The study and experimentation which has been carried on along this line has shown the best way to overcome the liability of damage from severe winter weather, so that we now have many very successful orchards and small fruit plantations. The soils of Minnesota are well adapted to orcharding and gardening, and nowhere are there better soils.

In fruit production in the last decade, Minnesota made the greatest progress of any state in the Union, according to the last census and the report of the United States pomologist, and as information as to the best varieties and methods of cultivation become more commonly known, this increase is destined to become more marked.

Minnesota produced about $550,000 worth of apples in 1903, and the raising of some varieties of




INTERIOR OF HORTICULTURAL HALL AT MINNESOTA STATE FAIR GROUNDS.

apples in favorable orchard sites has for many years been regarded as a safe commercial venture.

The introduction of hardier kinds and of better methods of orchard practice has resulted in widely extending apple growing, until now apples can be safely planted over a large area of the state, and no farm need be without its home orchard. For many years the apple known as Duchess of Oldenburg has been the standard of hardiness here, and has been planted more than any other, which has resulted in there being often a "glut" of this kind in some of the smaller places in August. But such varieties as Wealthy and Patten's Greening of the large apples extend the season well into the winter and are now widely grown. Such hybrid crabs as Transcendent, Gideon No. 6, Minnesota and Florence are also common. We have few very large apple orchards, but many from several to ten acres in extent. The prices obtained here for summer and autumn apples of good quality are seldom less than one dollar per bushel.

**Plum.**—No other wild fruit found in this country is superior to our native plum, and the last decade marks a decided advance in the cultivation of it. Formerly it was found wild in large quantities throughout the state and was an important source of fruit, but the plum groves have been destroyed by fire and by grazing. Our native plum is a vastly better fruit, even in the wild state, than were the progenitors of the plums commonly grown in the best sections of this country, and it seems to be especially susceptible to improvement. Fifteen years ago there were not more than half a dozen named varieties of this fruit offered by nurserymen, but to-day over 100 varieties can be obtained, and most of them are adapted to Minnesota. Some of the varieties recently introduced have qualities which seem to promise that they will be largely grown for marketing.

It is estimated that there are about 200,000 plum trees growing in this state, and these probably produce fruit to the value of about $50,000 per year. It is quite likely that within the next five years the yield of this fruit will be doubled, as it has been largely planted during the last few years, and many orchards have not come into full bearing condition.

**The native fruits** that are produced in abundance in good years are blueberries, cranberries, strawberries, raspberries, grapes, wild crab apples and native plums. These were an important source of fruit supply to the early settlers, and are now used to some extent.

**The small fruit industry** is on a profitable basis, and much of it is managed by shipping associations. The amount raised and marketed last year was probably not far from $600,000 in value.

Raspberries do excedingly well here and are perhaps as profitable as any small fruit that we raise. In some sections it is not necessary to cover the plants in winter, but as a rule it is regarded as profitable to do so.

Blackberries are not generally grown, but in favorable situations they are often exceedingly profitable.

A GROUP OF STRAWBERRY PICKERS.

Strawberries are easily grown by the methods generally followed in older strawberry growing sections of this country, but a little more attention must be paid to keeping a dust blanket on the soil in dry summers so as to protect from drought, and to mulching in winter.

Currants and gooseberries are raised with the greatest ease.

Grapes would be more generally grown were it not for the fact that we must compete with the grapes shipped in from more favorable locations, but there are thousands of acres of land in this state, along our rivers and lakes, that are adapted for raising this fruit, and were the price one cent per pound higher than at present, they would be raised in large quantities. Rather more care is required to raise this fruit in this section than in some of the Eastern States, owing to the fact that the vines must be protected in winter. The varieties grown are the popular kinds of the Northern States, but the Delaware does particularly well here in favorable locations.

## Ornamental Horticulture.

In the pioneer stage of any country the settlers are generally poor, and the necessity of providing for ornamental horticulture is not felt, but as wealth increases there is found to be time for such matters in all highly civilized communities. Such has been the history of this great state, and to-day there is great popular interest taken in gardening in all its branches, including public and private parks, lawns, flower borders and well planted streets and parkways, and the evidence of wealth and refinement shown in this way in Minnesota speaks forcibly of the condition of our people. The larger cities have magnificent park and boulevard systems, which are well supported, and in extent and beauty of conception and maintenance rival the parks of many of the larger but older and richer cities of this country. The residence portions of our cities and towns are often tastefully laid out, and our citizens take much pride in their beautiful avenues, lined with comfortable homes, before which are well planted lawns and boulevards.

The area devoted to public parks in St. Paul is 1,300 acres, in Minneapolis 1,748 acres, and in Duluth

500 acres. There is no way of estimating the value of such work, as its uplifting influence is priceless.

## Commercial Floriculture.

No branch of horticulture has shown a more phenomenal increase in Minnesota than the business of raising and selling flowers and ornamental plants. During the life of some who are still living and in the business, this has grown from nothing to about $400,000 per year. It is doubtful if there is any other one factor in the state that is a more certain index to the growth of refinement and intelligence of our people. This business is constantly increasing, and our growers have most excellent houses and up-to-date arrangements for the production of the best flowers.

## The Nursery Business.

Our nurserymen are progressive and energetic, and as a rule aim to sell stock that is adapted to our con-

THE PEONY BORDER.
Minnesota Experiment Station.

ditions. It should be more generally known that the climate of this portion of the great continental plain in which Minnesota is located is peculiar. This has made it necessary for the development of its horticulture that it should have a special system of its own, and our nurserymen take great pride in raising nursery stock that is adapted to these conditions. The sales of nursery stock in Minnesota each year probably aggregate about $500,000.

## Windbreaks.

Much attention has been and is still given to the making of proper windbreaks around our prairie homes in this section, and their value is becoming more and more apparent as the live stock industry increases, and as our population becomes more settled and desires to remain on the home farms. There is no way of estimating the value of such windbreaks, as they are not generally figured in the tax levy. However, there can be no question but what these

windbreaks represent an investment of several millions of dollars, and their presence on our prairies adds very much to the beauty of the landscape, as well as to the comfort of the dwellers there and of travelers.

## Vegetable Gardens.

Vegetable gardening is very generally practiced, and there are many gardens that are models, both in and near our towns and villages and on the farms. All the garden vegetables of the north temperate zone are grown here with the greatest ease, and it is generally a surprise to parties coming here from the Eastern States to note the facility with which such tropical plants as melons, beans, corn, egg plant and tomatoes, and such cool climate crops as celery, cabbage and peas are grown. It has been estimated that the value

189-POUND PUMPKINS.

of the home gardens to Minnesota cannot be less than $3,500,000. The climate seems to be especially favorable to vegetables, and there is much less trouble from plant diseases than in more humid sections.

## The Trucking Business.

About our larger cities there has been a great increase in the business of raising and shipping vegetables during the last ten years. Previous to that time, little was done more than to supply local wants, but now a large amount of garden truck is shipped to various points outside of the city. The value of this trucking business in this state is probably not far from $1,000,000. There is about $100,000 worth of

SCENE ON HENRY SCHROEDER'S FARM, NEAR SABIN, MINN.
Using four Potato Planters, Planting Twenty-five Acres Potatoes Daily; 540 Acres in 1903.

vegetables raised in greenhouses and hotbeds each year. This, of course, means vegetables that are sold during the winter, or in the early spring or summer, and the business is constantly increasing.

## Potatoes.

We raise annually in Minnesota from 14,000,000 to 18,000,000 bushels of potatoes, about 6,000,000 to 7,000,000 bushels of which are annually shipped out of the state. The amount of potatoes grown here is increasing each year and some of our largest dealers estimate that in ten years we will be raising perhaps 22,000,000 bushels. At a conservative estimate this product is probably worth $4,250,000.

All the standard sorts of potatoes are grown in the State of Minnesota. These are in favor for general consumption in the leading markets and among the potato growers of the Southern and Central States for seed stock, for which purpose many carloads are sold each year. While we have more or less loss from potato diseases, yet as a rule the plants are healthy and yield heavily.

A TYPICAL FARM HOME ON MINNESOTA PRAIRIES.

# EDUCATION.

By A. W. Rankin, State Inspector of Graded Schools.

Not in Minnesota does the child of the state, hungry for education, ask for bread and receive a stone.

So wisely has the landed endowment, bestowed by the national government on her admission to the Union, been husbanded, that it now amounts to some $15,000,000, and is steadily increasing every year. From the investment of this fund in choice securities annually flows a Pactolian stream, richly supplementing a moderate local tax, and supporting a splendid system of schools of all grades, from the rural primary to the university, thus making it easily possible for every young Minnesotan to reach the limit of his or her capacity in mental acquirement.

In common with other states and territories organized since 1848, Minnesota received two sections of land in every township for purposes of public schools. The grant to Minnesota amounted to about 3,000,000 acres, which has been carefully managed, and is sold under restrictions imposed by the legislature. This permanent endowment fund is the largest public school fund of any state in the Union excepting Texas, and invested in interest-bearing bonds yields an income of about $450,000 annually, and is distributed to school districts in proportion to their respective school populations. The land grant is only about one-third sold, and it is estimated that it will ultimately yield a permanent endowment of thirty or more millions of dollars.

The national government granted land also for the support of the university. This land has been partially disposed of and the money received is invested in interest-bearing bonds. The income from this source is about $65,000 annually, and is used to assist in paying the expenses of the university.

In 1887 the legislature passed a bill providing for a mill tax to aid in the support of the schools of the state. This one mill tax, together with the interest from the permanent fund referred to above, gives the schools about $3.60 per pupil.

In 1878 the legislature inaugurated the policy of bestowing special grants to the high schools of the state. This policy has expanded until the grant is extended to the four classes of schools mentioned at the beginning of this article. The rural schools, employing a first grade teacher and having eight months of school, receive $125 each year; the semi-graded schools, $250; the graded schools, $550; the high schools, $1,500. In the last distribution, made in August, 1903, the rural schools participated to the number of 913; the semi-graded schools to the number of 275; the graded schools to the number of 121; the high schools to the number of 155. The total amount appropriated to the several classes was $450,000.

This sum acts, not as an incentive to lessen local taxation, but rather to encourage communities participating in the fund to support better schools. Very

few of the schools in any class fail to provide more money by local tax than they would were it not for the stimulus and encouragement given by the aid received from the state.

The public school system of Minnesota has been a gradual development. Its progress has been a genuine evolution, keeping pace with that of other elements in the civilization of the state. While the example of older states has been of assistance, many new questions have been met and solved. Absence of precedents often means absence of ruts. A community in the making is instinct with life. Education can never be healthy in a dead community where legends and traditions prevent independent thought.

In the free and vigorous life of the Western pioneer a clearness of vision is born which will go far to effect a solution of the questions which have vexed humanity. Not the least of these questions has been the attitude of the state toward education. While it is generally conceded that the state should educate the child and the youth, it is not so generally granted that the state has a duty to the maturer citizen as regards his higher education. The four thousand students in the various departments of Minnesota's great university is an answer to this question by the people of the West. Minnesota believes in educating the child, the youth, the man, the farmer, the teacher, the thinker, the engineer, the professional man. She shows her faith by her liberality toward her common schools, toward her high schools, toward her normal schools, toward her schools for indigents and defectives, and toward her university. Minnesota has a heterogenous population, so far as nationality is concerned, but this is being rapidly fused by the schools into a citizenship of which the United States may well be proud.

## State Public School System.

Minnesota's system of state schools is classified as rural, semi-graded, graded and high. These schools form a series leading up to the State University and to the normal schools.

The class of schools designated as "rural" are, as the name indicates, located in country districts. They are one-room schools. The number of pupils in each varies according to the surrounding population, whether sparse or abundant. The teachers in these schools are generally certificated by the State Superintendent of Public Instruction, thus insuring a more competent body of instructors than would be available under less centralized authority. In fact, this method of certificating rural teachers is rapidly improving these schools. It is also creating an advance in wages, so that many excellent teachers now find it more profitable to teach in the country than in villages or cities. This is highly advantageous to the entire state, since upon the rural schools as a foundation rests the superstructure of this public system of education.

The rural schools are supervised by county superintendents elected by the people. These supervisors visit the schools two times or more each year. They

hold office for two years. Minnesota has always been extremely fortunate in having public spirited and efficient men and women largely represented in its county superintendency. Some of the county superintendents, who have been reëlected many times, are among Minnesota's most esteemed workers in education.

MINNESOTA STATE SCHOOL OF AGRICULTURE AND U. S. EXPERIMENT STATION.

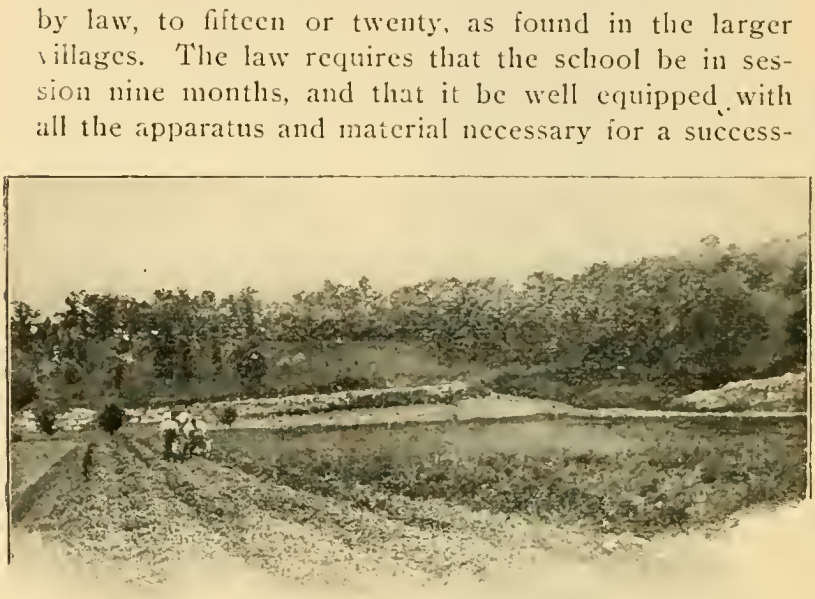
The rural schools are supported mainly by direct local taxation and by an annual apportionment from funds explained under the chapter on state aid. The burden of taxation is not heavy on the individual taxpayer. In fact, the tax paid by patrons of rural schools is the lowest among the taxes paid by supporters of the various classes of schools.

The buildings in which rural schools are held, while leaving much to be desired, are rapidly improving. Much attention is given to heating and ventilating properly, and the rude, old-time log building, with its rough benches, will soon, as far as Minnesota is concerned, live only in the story of the pioneer.

The "semi-graded school" is a school of two or three teachers. It is found in the more thickly settled

country school districts. The conditions surrounding this school are much the same as are found in the "rural," or one-room school. The system of supervision and of certification of teachers is the same. Educationally, its advantage over the first class lies in its possibility of more systematic grading of pupils, and in the inspiration arising from community of interest found whenever two or more associate in similar work. Considerable attention is now being given to the consolidation of two or more one-room schools and to the conveyance of pupils at public expense to the most convenient center. Sentiment in favor of consolidation is being rapidly created, and wherever tried the plan is found to be successful.

The "graded school" is one possessing certain qualifications enabling it to draw the special aid granted by the state to "State Graded Schools." The teachers in it range from four, the minimum allowed by law, to fifteen or twenty, as found in the larger villages. The law requires that the school be in session nine months, and that it be well equipped with all the apparatus and material necessary for a success-



A NEW HARDY ALFALFA.
At Minnesota Experiment Station.

ful school. These schools have a special inspector appointed by the state high school board, whose duty it is to visit them at least once each year and to make a report showing their condition. The course of study includes a thorough treatment of the common branches and as much of high school work as is possible in the respective communities. The help afforded these schools by state aid results in a higher degree of efficiency in many village schools than could be otherwise reached. In most villages the total valuation of property to be levied upon for support of the schools is not large, and, obviously, without state aid, a much higher tax rate would be needed to keep these schools up to their present standard.

The high schools of Minnesota include only those which furnish a full four years' course. These schools are liberally aided by the state and are absolutely free of tuition, not only to pupils within the district comprising the territory taxed for each school, but also to any pupil in the state. Each school is inspected at

least once a year by an inspector appointed by the state high school board. A high degree of efficiency is demanded of any school as prerequisite to its being placed on the high school list. These high schools are also aided by a special fund distributed by the state high school board, thus making it possible for villages to have efficient high schools which would be altogether beyond their reach except for this aid furnished by the state.

Minnesota has five normal schools supported by state funds. These are located at Winona, Mankato, St. Cloud, Moorhead and Duluth, and were established in the order named. These cost the state for annual current expenses about $175,000. There are about 1,750 pupils in the professional courses of these schools, and from 300 to 400 men and women are graduated each year. These graduates are eagerly welcomed to the teaching force of the state. While these normal schools are growing rapidly in number of pupils, the growth in numbers does not equal the increase of appreciation in which they are held, nor of desire to secure normal graduates as teachers. Minnesota is justly proud of its normal system for the education of teachers.

In 1872, a committee consisting of the president of the state university and of other educators, in discussing the educational system of the state, assumed that "the State University should form the 'roof and crown' of a noble structure of high schools, based firmly on the broad foundation of the common schools of the state." The years since that time have seen the realization of what was then only a dream. The State University of Minnesota has nearly 4,000 students in attendance in all departments. Were one to characterize the work of this university he would say that what distinguishes it above all other state universities is, not so much scholarship in the old sense of that word, as a policy of being of service to the state in the present. Therefore, the departments that have most to do with the activities of its people are not neglected. No ancient theory of education is allowed to stand in the way of meeting the needs of the people, both in their struggle with the pests which destroy the crops and in their greater struggle with the ignorance which makes possible the rule of the demagogue. As a result of this commendable aim on the part of the management of the university, its attendance comes largely from the practical and working classes of the state. Hence its student body is made up of young men and women who are there to prepare themselves to serve the state as farmers and engineers, as well as of those who are to become professional men in letters, medicine and law.

The School of Agriculture is second to no similar school in the world. The attendance at this school is increasing at a rapid rate. By wise management, classes are organized even for those farmers who must stick to their own farms during the months of preparation of soil and of cultivation and harvesting of crops. These classes are organized in January of each

year for a period of twelve weeks, and are of great help to many farmers who realize that the time demands more scientific agriculture than the untrained man can bring about.

Besides its common system of education, which includes the classes of schools named above, Minnesota has a school for indigent children. This school takes children who are deserted by their parents, or whose parents are unable to care for them, and cares for them until homes are found. Even then they are wards of the state, and are carefully looked after by state agents.

There are also schools for the blind, the deaf and dumb, and for other defectives. These schools are modeled after the most approved institutions of the kind, and are liberally provided for.

Minnesota has also colleges and schools supported by various religious denominations. Among these may be mentioned Carleton College at Northfield, one of the largest and strongest of the denominational schools of the state, which is supported by the Congregational Church. Hamline University in St. Paul is a successful Methodist college. It is acquiring a large endowment. Macalester College also is in St. Paul. This is a Presbyterian school, and bids fair to be an important factor in higher education in Minnesota. The various Lutheran bodies have strong schools, notably the Gustavus Adolphus College at St. Peter, the St. Olaf's College at Northfield, and various seminaries and colleges in Minneapolis and St. Paul. The Episcopal Church has noted schools at Faribault, and the Catholic Church has strong schools at St. Paul, St. Joseph and elsewhere.

# STATE LANDS AND TAXATION.

By Samuel G. Iverson, State Auditor.

Minnesota can rank as one of the older states in the Union, having been admitted nearly fifty years ago. During all these years and even back into territorial days it has been one of the most attractive spots in the United States to the landseeker in search of a home, or to the speculator for profitable investment. It will therefore be a surprise to most people to learn that there are still many million acres of government lands in Minnesota now open to entry under the public land laws. There are also several million acres of school and other state lands belonging to the trust funds of the state, which are still unsold, and several millions in the hands of private land companies or so-called speculators. The total area of the State of Minnesota is 84,287 square miles, or a total surface of 54 million acres. There are about 10,000 meandered lakes in the state, large and small, covering an area of about three and one-half million acres, leaving an actual land surface of 51 million acres.

On June 30, 1903, the Commissioner of the General Land Office at Washington reports that of the 51

million acres of land in the state, 43,343,040 acres have been appropriated, that is, actually patented, or are now held under the public land laws. This leaves 7,855,040 acres of government lands which were unappropriated at that time. Of the unappropriated lands about 2,700,000 acres are embraced within the Indian reservations of the state, and which will be held as such for some years to come. This leaves something over 5,000,000 acres of vacant or unclaimed government lands in Minnesota. About 650,000 acres, or nearly thirty townships, are still unsurveyed, which leaves about three and one-half million acres of government lands now actually open to settlement or entry under the United States land laws.

There are four United States land offices in Minnesota where vacant government lands can be entered, at Duluth, Crookston, St. Cloud, and Cass Lake. Nearly all the lands are in the northern part of the state, north of the main line of the Northern Pacific Railroad. The lands are located largely in the counties of St. Louis, Lake, Cook, Itasca, Beltrami, Aitkin, Cass and Crow Wing, with scattered tracts in several of the other northern counties. The surface in that part of the state is gently rolling, and mostly covered with timber, principally of the pine and tamarack varieties, with occasional forests of hard wood, and some spruce, cedar and balsam. The land when cleared is very productive of all kinds of grain and vegetables; a very small percentage of it only is untillable. Railroads are now being built into that part of the state, and it will be but a short time before nearly every township will be within easy access of transportation facilities.

The vacant and unoccupied lands in Minnesota may be classed under three heads: government, state, and private or speculators. Vacant government lands may be obtained, first, by homestead; second, under the timber and stone act, and by land warrants or scrip.

A party going into an unsurveyed township and squatting upon a piece of land acquires a preferred right to the land as a homestead, and is permitted sixty days' time in which to make an entry for the land after the township has been opened for settlement. He must be a *bona fide* settler upon the land and must have begun his improvements.

## State Lands.

State lands are classified under three heads, agricultural, timber and mineral, and are under the immediate care and control of the State Auditor, who is also Commissioner of State Lands at the State Capitol.

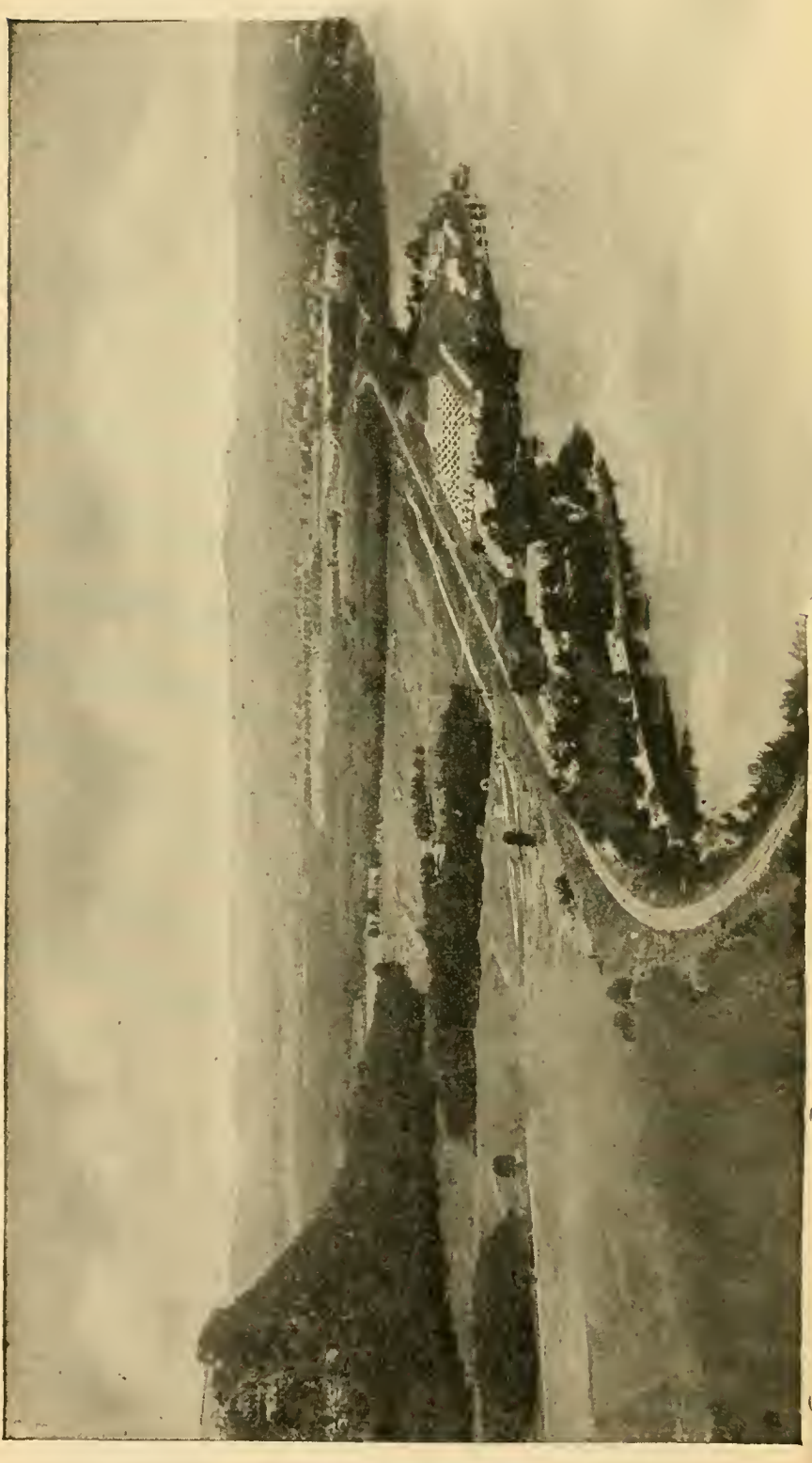
State lands belong to the various trust funds, such as school, university and the different state institutions. There are about two and one-half million acres of the various kinds of state lands still for sale. They are located mainly in the northern part of the state, and in quality will average up with other lands open for entry under the United States laws, or for sale in private hands.

The laws of our state provide for their sale or disposition, and full information as to these laws can be secured by addressing the State Auditor at St. Paul.

## Private Lands.

Under this head may be embraced lands granted in aid of railroads, still unsold, now owned by railroad companies or disposed of to land companies, and those held by individuals for speculative purposes.

SUMMER CAMP
MINNESOTA
STATE
NATIONAL
GUARD,
LAKE CITY,
MINNESOTA.



It is difficult to say the amount of such land on the market, but there are still large tracts which can be purchased at a price that will be attractive to the actual homeseeker or the investor. The railroad companies

with lines into the western and northern parts of the state have good lands for sale varying in price from six to twenty dollars per acre and on convenient terms. Those tracts owned by private parties can no doubt be obtained at similar prices. Railroad and private lands now on the market are located nearer to transportation lines and markets than the vacant public lands.

The vacant public, state and private lands certainly afford the man of moderate means a good opportunity for securing a home in Minnesota, and that means a home in the very heart of one of the most prosperous districts in the United States. The pioneers of Minnesota were brave, enterprising and patriotic men. They built a broad, sound and conservative constitution for the new state. Wisdom, justice, moderation and patriotism have been conspicuous characteristics of the life of our people. Our laws afford ample protection for every department of human activity, yet free from any radicalism. Our schools and state institutions are renowned. Our common schools are endowed for all time with the largest school fund of any state in the Union, worth upwards of $50,000,000. Our population can be trebled and still there would be room for more.

## Taxation and Wealth.

The constitution of Minnesota provides that all taxes to be raised in the state shall be as nearly equal as possible, and all property on which taxes are to be levied shall have a cash valuation and be equalized and uniform throughout the state.

In addition to the taxation of real and personal property, under provisions named above, we have certain substituted or specific forms of taxation for taxing property of corporations. These taxes, when paid, are in lieu of all other taxes. Railroad companies now pay three per cent of the gross receipts or earnings of the mileage within Minnesota. The legislature of 1903 passed an act providing for an increase of the tax to four per cent; this must be ratified by the people before it becomes operative. It will be voted upon at the general election in 1904. The tax applies to earnings from business originating outside and destined here, and beginning here and shipped to points outside the state, also on traffic passing through the state.

For the year ending 1903, the railroad taxes will amount to about two and one-quarter million dollars, at three per cent. Telephone companies pay a tax of three per cent upon gross receipts; about $50,000 is annually received from that source. Express companies pay five per cent on gross receipts, producing about $20,000. Fire and life insurance companies pay two per cent on gross receipts, producing about $250,000 annually. Owners of vessels sailing international waters pay a tax at the port from which they hail of three cents per net ton of the registered tonnage; about $15,000 is paid in that way. Telegraph and freight line companies are assessed by the state board of equalization and taxed at the average rate of taxation in the state; about $30,000 is received from that source. All

specific taxes are paid directly into the state treasury, and go to the support of the state government.

The revenue for the support of counties and municipalities is almost wholly made up of the taxes upon real and personal property. The valuations are made first by the assessors and equalized by town, county and state boards of equalization. The figures show all classes of property to be assessed at an average of about 40 per cent of its true cash value.

For the year 1903 there were 39,000,000 acres of land assessed, exclusive of town lots; the average assessed valuation for each acre is $10.20. The total assessed value of real property, including acre, town and city lots, with improvements and structures, is $653,000,000.

For the year 1903 the amount of personal property increased from $114,000,000 in 1902 to about $132,000,000, giving the total assessed valuation of all property at this time of about $785,000,000. The total amount of general taxes levied in the state, including state, county, city, village, township and school district taxes for the year 1903, is about $19,000,000. To produce that sum on the total assessed value named we obtain an average tax rate throughout the state of two and one-half per cent. The tax levied for support of state government is one mill, or about $780,000 of total taxes levied. The remainder is for various local purposes. Of the total taxes levied nearly $7,000,000 goes to the support of public schools of the state. Property being assessed at about 40 per cent of its value, it will, therefore, be seen that the actual value of taxable property in Minnesota is about $2,000,000,000, and these figures are under rather than overestimated.

The State of Minnesota is well equipped with state institution buildings. We have one state prison, one reformatory, one training school, three hospitals for insane, and two hospitals for chronic insane, a state university, five normal schools, one school for blind, one for deaf and dumb, one for defectives, one school for education and care of orphan children, one home for soldiers and sailors of the civil war. The total cost of buildings for state institutions is about $10,000,000.

In addition to the above a new capitol is under construction at a cost of $4,500,000. The State of Minnesota is nearly free from debt. On Jan. 1, 1904, there were $959,000 of bonds outstanding, drawing three and one-half per cent. Payment of principal and interest is provided by a tax levy of two-tenths of one mill, which will discharge the debt at the rate of about $125,000 a year.

A GOOD CATCH.

# RAILROADS AND TRANSPORTATION.

By A. C. Clausen, Secretary Railroad and Warehouse Commission.

When the pioneer settler first invaded the Territory of Minnesota and established towns and villages, the only means of transportation from the south and east was by river boats on that then great highway, the Mississippi river, and by freight wagons across the prairies. The river steamboats placed St. Paul, the capital city of Minnesota, in closer touch socially and in a business way with the city of St. Louis than it is to-day with all the modern facilities for travel.

Within the territory a few steamboats and "bateaux" traversed part of the upper Mississippi, the Minnesota river, and the Red river, while on land, strings of Red River carts, a rude two-wheeled vehicle with a carrying capacity of six hundred pounds, threaded their precarious way along the trails through the territory of often hostile Indians, as far northwest as Fort Garry at the confluence of the Red and Assiniboine rivers, where the city of Winnipeg now stands.

It is needless to state that freight rates in those days were high, in fact, almost prohibitive. Extensive settlement under such conditions was not possible, and only hardy and adventurous pioneers dared venture into the wilds and establish homes. Yet many did so and dwelt for years remote from the conveniences of civilization, with minds unvexed by discriminative railroad rates or rebates, and untroubled by thoughts of the possible consolidation of competing lines.

Minnesota was organized as a territory under an act of Congress passed on March 3, 1849, and the territorial legislature, during the craze for railroad construction schemes which spread over the United States and prevailed in a violent form in this state during the years 1853 to 1857 (continuing till 1870), granted charters to twenty-six railroad companies.

On February 26, 1857, Congress passed an act authorizing the creation of the State of Minnesota, and under the state laws, articles of incorporation were granted to forty-six railroad companies.

These seventy-two railroads were, for the most part, "air" lines of a strictly atmospheric character, but so intense was the demand for railroad facilities in the state, that any enterprise bearing the name railroad was eagerly taken up by the people, and its exploitation was easy. Large sums of money were invested in these enterprises, town sites and townsite companies sprang up all over the state, but especially in the southern and central counties; villages, cities, townships and even counties gave bonuses aggregating $1,781,500.00 to aid railroad construction, and so created large debts under which they struggled and groaned for many years. Congress granted lands amounting ultimately to 17,621,952 acres to different lines, including the Northern Pacific Railway, and the state, not to be outdone, loaned its credit to the extent of five million dollars, and granted 3,062,141 acres of swamp land (including the grant of the Duluth & Iron Range Railroad Company), to aid the construction of railroads.

Some of these land grants, it should be stated, were never earned, while in other cases the companies lost large quantities of land by reason of delay in construction, prior settlement and other causes, so that the total amount of land ultimately received by the railroads has probably not exceeded fifteen million acres.

Of the five million dollar loan authorized by the state legislature, but $2,275,000 was issued in the form of bonds, and it was owing in a large measure to popular antagonism to the loan that the first period of inflation of railroad enterprises came to a disastrous end. Then came the reaction and a period of financial depression, during which the worthless schemes and paper railroads were all weeded out and the true era of legitimate railroad construction commenced.

In the spring of 1862, the Hon. A. J. Edgerton, Railroad Commissioner of Minnesota, reported that there was not a mile of railroad in Minnesota, but during that year construction was undertaken in earnest, and by December, 1871, there was built and in operation, 1,550 miles of railroad in the state.

The railroad companies at that time recognized the fact that the area of wheat land in the United States was limited and that Minnesota furnished a greater area where wheat could be profitably raised than any other state in the Union. Hence the quick recuperation from the period of over-speculation, and the rapid construction of lines of railroad eager to acquire control as much as possible of this profitable territory.

From the railroads actually operating in Minnesota in 1871-72, and the more recent railroads in the Iron Ranges, have been built up the great internal and transcontinental systems which now extend their lines like a network in every one of the eighty-three counties of the state.

The rapidity of railroad growth is shown in the following table, which gives the aggregate mileage, capital stock, funded debt, gross earnings, etc., of the roads for four decades to the close of 1903.

In December, 1871, there were 1,550 miles of railroad in Minnesota, and in December, 1903, there were 7,250 miles in operation.

These lines of railroad paid into the general revenue fund of the state, in taxes for 1902, $1,922,204, and as the cost of state government is $3,250,000 it leaves but a little over $1,250,000 to be raised annually by general taxation on other property.

The total amount of bonds and stock of the railroad companies operating in Minnesota, as reported by them for the year ending June 30th, 1903, was $1,995,869,128, of which Minnesota's proportion, estimated on a mileage basis, is $294,110,600, or an average of $41,611 per mile. The total gross earnings of all railroads from operation in this state for the same year was $68,061,499, divided as follows:

| | |
|---|---|
| From freight ..... | $52,926,337 |
| Passengers ..... | 11,504,521 |
| Miscellaneous sources.... | 3,630,641 |

The question of railroad rates became a burning issue in Minnesota as soon as railroad construction and operation became sufficiently extensive to enable the people to perceive the effects of rate discrimination. In 1871 the rates charged by different roads in the state varied from 1¼ cents per ton per mile to 5⅓ cents, while the rate charged from Chicago to the Eastern market was 1.35 cents per ton per mile, and the general cost, as estimated by Poor, the railroad statistician, was 1¼ cents. The state, therefore, asserted its right to control railroad rates and to supervise their operation, and, after a long struggle and much litigation, it carried its point, and a State Railroad Commission was created for the purpose. The objects and powers of this commission are dealt with at length further on, but it can be truthfully stated that it has accomplished great things for the people during its existence, exacting fair treatment from the railroads for all classes of shippers, farmer, merchant or manufacturer. Equal rates have been established on all lines of railroad, and substantial reductions in freight and passenger rates have been secured from time to time, as warranted by

## Statement Showing Comparisons of Stock and Debt, Gross Earnings, Operating Expenses, Net Earnings, and Taxes Paid for Years 1871, 1881, 1891, 1901 and 1903.

| YEAR | MILEAGE | CAPITAL STOCK ENTIRE LINES | FUNDED DEBT ENTIRE LINES | GROSS EARNINGS FROM OPERATION IN MINNESOTA | OPERATING EXPENSES MINNESOTA | NET EARNINGS MINNESOTA | TAXES PAID MINNESOTA | STOCK AND DEBT MINNESOTA. DIVIDED ON MILEAGE BASIS | AVERAGE AMOUNT PER MILE OF ROAD STOCK AND DEBT MINNESOTA |
|---|---|---|---|---|---|---|---|---|---|
| 1871 | 1,550 | $20,519,586 | $42,887,000 | $3,430,414 | $2,564,435 | $865,979 | $56,454 | Not Shown | Not Shown |
| 1881 | 3,217 | 187,862,423 | 143,114,220 | 13,921,339 | 8,385,556 | 5,535,683 | 329,555 | $118,348,022 | $36,788 |
| 1891 | 5,527 | 390,251,441 | 598,488,372 | 28,721,058 | 17,568,812 | 11,152,246 | 882,473 | 233,002,537 | 42,898 |
| 1901 | 6,993 | 650,968,350 | 843,777,810 | 42,459,262 | 25,703,735 | 16,755,527 | 1,659,071 | 273,448,971 | 38,654 |
| 1903 | 7,250 | 901,839,239 | 1,094,029,889 | 68,061,499 | 32,302,296 | 35,759,203 | *1,922,204 | 294,110,600 | 41,611 |

*1902.

## Statement Showing Comparison of Merchandise and Commodity Rates for the Years 1887 and 1904.

## GREAT NORTHERN RAILWAY COMPANY.

| BETWEEN ST. PAUL AND | YEAR | CLASSIFICATION | | | | | | | | | | LUMBER | COAL* | GRAIN | | | LIVE STOCK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | A | B | C | D | E | | | FLAX | WHEAT | COARSE GRAIN | CATTLE | HOGS | SHEEP† |
| St. Cloud.... | 1887 | $ .40 | $ .34 | $ .26 | $ .20 | $ .16 | $ .16 | $ .14 | $ .12 | $ .09 | $ .07 | $ .08½ | $2.00 | $ .09½ | $ .09½ | $ .09½ | $22.50 | $22.50 | $22.50 |
| | 1904 | .34 | .29 | .22 | .17 | .14 | .14 | .12 | .10 | .08 | .07 | .07 | 1.50 | .08 | .08 | .08 | 20.43 | 19.75 | 20.43 |
| Willmar..... | 1887 | .45 | .38 | .29 | .23 | .18 | .18 | .16 | .14 | .11 | .09 | .11 | 2.20 | .11 | .11 | .11 | 25.50 | 25.50 | 25.50 |
| | 1904 | .40 | .34 | .26 | .20 | .16 | .16 | .14 | .12 | .10 | .08 | .09½ | 1.95 | .09 | .09 | .09 | 22.80 | 21.00 | 22.80 |
| Sauk Center. | 1887 | .49 | .42 | .32 | .25 | .20 | .20 | .17 | .15 | .12 | .10 | .12 | 2.05 | .12 | .12 | .12 | 27.00 | 27.00 | 27.00 |
| | 1904 | .43 | .37 | .28 | .22 | .17 | .17 | .15 | .13 | .10 | .09 | .10 | 1.80 | .09½ | .09½ | .09½ | 24.70 | 24.75 | 24.70 |
| Fergus Falls | 1887 | .66 | .56 | .43 | .33 | .26 | .26 | .23 | .20 | .16 | .13 | .15½ | 2.45 | .16½ | .16½ | .16½ | 34.00 | 34.00 | 34.00 |
| | 1904 | .56 | .48 | .37 | .28 | .22 | .22 | .20 | .17 | .13 | .11 | .13 | 2.00 | .11½ | .11½ | .11½ | 30.88 | 30.75 | 30.88 |
| Crookston... | 1887 | .88 | .75 | .57 | .44 | .35 | .35 | .31 | .26 | .22 | .18 | .21 | 3.25 | .21 | .21 | .21 | 42.00 | 42.00 | 42.00 |
| | 1904 | .67 | .57 | .44 | .34 | .27 | .27 | .23 | .20 | .16 | .13 | .15½ | 2.10 | .14 | .14 | .14 | 38.00 | 37.88 | 38.00 |
| St. Vincent.. | 1887 | 1.10 | .94 | .77 | .66 | .55 | .44 | .38 | .31 | .24 | .19 | .25 | 4.00 | .23 | .23 | .23 | 49.00 | 49.00 | 49.00 |
| | 1904 | .91 | .77 | .60 | .46 | .36 | .36 | .32 | .27 | .22 | .18 | .21 | 2.25 | .15 | .15 | .15 | 44.65 | 44.63 | 44.65 |
| Moorhead... | 1887 | .80 | .68 | .52 | .40 | .32 | .32 | .28 | .24 | .20 | .16 | .18½ | 3.00 | .20 | .20 | .20 | 39.00 | 39.00 | 39.00 |
| | 1904 | .67 | .57 | .44 | .34 | .27 | .27 | .23 | .20 | .16 | .13 | .15½ | 2.10 | .14 | .14 | .14 | 35.63 | 36.25 | 35.63 |
| Hinckley.... | 1887 | .45 | .38 | .29 | .23 | .18 | .18 | .16 | .13 | .10 | .08 | .10½ | ..... | .10 | .10 | .10 | 25.00 | 25.00 | 25.00 |
| | 1904 | .35 | .30 | .23 | .17 | .09 | .12½ | .11½ | .09 | .08 | .06½ | .05 | 1.25 | .07½ | .07½ | .07½ | 20.00 | 19.50 | 14.75 |
| Morris..... | 1887 | .56 | .48 | .36 | .28 | .22 | .22 | .20 | .17 | .14 | .11 | .14 | 2.40 | .13½ | .13½ | .13½ | 31.00 | 31.00 | 31.00 |
| | 1904 | .50 | .43 | .33 | .25 | .20 | .20 | .18 | .15 | .12 | .10 | .11 | 2.05 | .10½ | .10½ | .10½ | 27.82 | 27.16 | 27.82 |
| Breck'nridge | 1887 | .72 | .61 | .47 | .36 | .29 | .29 | .25 | .22 | .18 | .14 | .17 | 2.75 | .18 | .18 | .18 | 37.00 | 37.00 | 37.00 |
| | 1904 | .61 | .52 | .40 | .31 | .24 | .24 | .21 | .18 | .15 | .12 | .14½ | 2.10 | .12½ | .12½ | .12½ | 33.73 | 33.00 | 33.73 |

the constantly increasing business of the railroads and the needs of the people. It is but fair to add that many of the railroad companies have made voluntary reductions in their rates, while other have met the demands of the State Commission cheerfully and promptly, recognizing their justice and equity.

# CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY.

| BETWEEN ST. PAUL AND | YEAR | CLASSIFICATION | | | | | | | | | | LUMBER | COAL* | GRAIN | | | LIVE STOCK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | A | B | C | D | E | | | FLAX | WHEAT | COARSE GRAIN | CATTLE | HOGS | SHEEP† |
| Ortonville... | 1887 | $ .38 | $ .49 | $ .38 | $ .29 | $ .23 | $ .23 | $ .20 | $ .17 | $ .15 | $ .12 | $ .15½ | $2.50 | $ .15 | $ .15 | $ .13½ | $ .17 | $ .17 | $ .17 |
| | 1904 | .53 | .45 | .35 | .27 | .21 | .21 | .19 | .16 | .13 | .11 | .12½ | 2.35 | .13½ | .11½ | .11½ | .16½ | .17½ | .17½ |
| Northfield... | 1887 | .30 | .26 | .20 | .15 | .12 | .12 | .11 | .09 | .08 | .06 | .08 | 2.50 | .08 | .08 | .08 | .10 | .10 | .10 |
| | 1904 | .28 | .23 | .18 | .14 | .10½ | .11 | .10 | .08 | .07 | .05½ | .07 | 2.15 | .08 | .08 | .07 | .09 | .09 | .09 |
| Lansing..... | 1887 | .41 | .35 | .26 | .20 | .12½ | .16 | .14 | .12 | .10 | .08 | .10 | 2.50 | .12 | .10 | .10 | .16 | .16 | .16 |
| | 1904 | .37 | .30 | .22 | .16 | .12 | .15 | .13 | .11 | .10 | .07 | .09 | 2.25 | .10 | .10 | .09 | .12 | .12 | .12 |
| Hutchinson . | 1887 | .35 | .30 | .23 | .18 | .14 | .14 | .12 | .11 | .09 | .07 | .09 | 2.50 | .09½ | .09½ | .09½ | .11½ | .11½ | .11½ |
| | 1904 | .33 | .28 | .22 | .17 | .13 | .13 | .12 | .10 | .08 | .07 | .07 | 2.25 | .08 | .08 | .08 | .10¾ | .11 | .11 |
| Appleton.... | 1837 | .54 | .46 | .35 | .27 | .22 | .22 | .19 | .16 | .14 | .11 | .15 | 2.50 | .15 | .15 | .13 | .16½ | .16½ | .16½ |
| | 1904 | .50 | .43 | .33 | .25 | .20 | .20 | .18 | .15 | .12 | .10 | .12 | 2.35 | .13½ | .11 | .11 | .16½ | .16½ | .16½ |
| Mankato .... | 1887 | .50 | .43 | .33 | .25 | .20 | .20 | .18 | .15 | .13 | .10 | .12 | 2.50 | .15 | .13 | .12 | .16 | .16 | .16 |
| | 1904 | .42 | .34 | .25 | .19 | .15 | .16 | .14 | .13 | .11 | .08 | .09 | 2.25 | .10 | .10 | .10 | .12½ | .12½ | .12½ |
| Sherburn.... | 1887 | .52 | .46 | .34 | .26 | .21 | .21 | .18 | .15 | .13 | .10 | .14 | 3.00 | .20 | .15 | .15 | .16½ | .16½ | .16½ |
| | 1904 | .44 | .35 | .25 | .18 | .15 | .18 | .16 | .14 | .13 | .10 | .10½ | 2.25 | .14 | .12 | .11 | .16 | .16 | .16 |
| Pipestone.... | 1887 | .62 | .53 | .40 | .31 | .25 | .25 | .22 | .19 | .16 | .13 | .17 | 3.50 | .20 | .18 | .16 | .20 | .20 | .20 |
| | 1904 | .57 | .47½ | .34 | .25 | .20 | .22½ | .19 | .17 | .14 | .12 | .12 | 2.50 | .16 | .13 | .13 | .18 | .18 | .18 |
| Albert Lea... | 1887 | .44 | .37 | .29 | .20 | .12½ | .17 | .15 | .13 | .10 | .08 | .11½ | 2.50 | .14 | .13 | .11 | .15 | .15 | .15 |
| | 1904 | .38 | .30 | .22 | .16 | .12 | .16 | .13 | .11 | .10 | .07 | .09 | 2.25 | .10 | .10 | .09 | .12 | .12 | .12 |

*Coal Rates are from Duluth.

†Sheep Rates are for double deck cars on the Great Northern Railway and for single deck cars on the Chicago, Milwaukee & St. Paul Railway.

NOTE—Rates are in cents per 100 pounds with the following exceptions: (1) All Coal Rates are in dollars per ton; (2) Great Northern Live Stock Rates are in dollars per car.

Since 1885 the commission has reduced the passenger rates in this state from 5 to 3 cents per mile. It has also reduced the rates on lumber, coal, grain, live stock and merchandise. To afford an idea and comparison of rates now in force as against those which formerly applied, attention is directed to the following table:

For the benefit of persons who are not well acquainted with railroad freight classifications, the following brief explanatory statement is given:

Class 1.—Includes groceries, dry goods, hats, boots and shoes, umbrellas, fresh meat, poultry, books, stationery, etc.

Class 2.—Includes hardware, leather, candy, liquors, salt meats in sacks, and several kinds of paper.

Class 3.—Includes agricultural implements in less than carloads, beer in wood, seeds, new furniture in car loads, etc.

Class 4.—Includes sugar, coffee, nails, iron, paint, lumber, coal, and articles of considerable weight for their bulk but of low value.

These first four classes cover shipments in quantities less than carloads. Other classes cover carload lots.

Class 5.—Includes sugar, coffee, nails, iron, wire, paint, packing house products, oils, beer, mineral waters, glass, etc.

Class A.—Includes agricultural implements, machinery of most kinds, trees and shrubbery, etc.

Class B.—Includes emigrants' effects and stock, some kinds of paper and strawboard fillers, grain and screenings, box material, etc.

Class C.—Includes hay and straw, cement, junk, green vegetables of some kinds, potatoes, lime, etc.

Class D.—Includes various kinds of ore, coal, pitch, ground shells, etc.

Class E.—Includes sand, stone, fertilizer, brick, sewer pipe, wood, etc.

The principle upon which the state, through its Railroad Commission, has insisted and has carried out in regard to railroad rates, was clearly stated by Commissioner A. J. Edgerton in his annual report made to the legislature in 1871, in the following terms:

"Establish by law a fair and just tariff from all points, and whenever railroads enter upon a struggle to break down competition they must do so at their own expense and not at the expense of the producers who happen to reside at a distance from the points of competition."

So important has been the work of the State Railroad and Warehouse Commission that a short history of its creation and acts is necessary for a clear understanding of the railroad situation in Minnesota. It is an active, energetic and useful body; its powers are broad and have been effectively used for the benefit of the people.

There is no more important field of legislation than state control of railroads, and in this respect Minnesota is in the vanguard of all the other states; its laws secure all the rights of the people and have been so carefully considered, judicially drawn and wisely administered that the development of the business interests of the state, both agricultural and commercial, have in no wise been retarded. The Interstate Commerce Act and the Minnesota Railroad and Warehouse Commission Act were the pioneers in public control laws.

The Railroad Commission is charged with the duty and the labor of administering these laws, as apply within the state, and with the responsibility of their enforcement. It is in session every secular day of the year for the purpose of discharging this duty and meeting this responsibility. It will be easily understood that its correspondence is very extensive—some unreasonable complaints are made to it—but all such are attended to and the complaining party fully answered. No unreasonable or unlawful demands are made of the railway companies. All reasonable complaints are promptly attended to—and for the most part satisfactorily adjusted.

Railroad companies operating railroads in this state are required by law to pay taxes on the basis of their gross earnings, which consist of business beginning and ending within the state, and a proportion based upon the proportion of the mileage within the state to the entire mileage over which such business is done, of earnings on all interstate business passing through, into or out of the state. For the first three years of operation the tax is 1 per cent; for the next seven years, 2 per cent, and after ten years, 3 per cent.

Railroad companies are required to make verified reports of gross earnings for the calendar year to this commission on or before February 1st each year, and it is the duty of the commission to certify said returns to the State Auditor, showing the per centum and the amount of tax due thereon.

The State Auditor then makes his draft on the railroad corporation for the amount of tax due and places the same in the hands of the State Treasurer for collection. Taxes paid in 1903 by the railroad companies approximated two million dollars.

The Railroad and Warehouse Commission is not only called upon to administer the railroad laws of the state, but there is imposed upon them the duty of exercising a supervision over the grain interests of the state by virtue of the provisions of the warehouse and grain laws enacted in 1885 and since that time, the primary object being to afford protection to producers of grain in the matter of grades and weights when marketing their products at the terminal markets of the state.

In this capacity the commission has organized a system of grain inspection and weighing, involving the employment of over 200 inspectors, weighers and other necessary employes, who grade and weigh the grain under rule fixed by the commission for that purpose. The Minnesota inspection is known in all the grain markets of the world and enjoys distinction and full credit as being eminently just, fair and impartial.

For the crop year ending August 31st, 1903, there were inspected and weighed on arrival at Minneapolis and Duluth, the two large terminal points for grain handling, 213,216 carloads of grain and flaxseed. There were inspected and weighed out of store at the same points the equivalent of 117,000 carloads of grain and flaxseed.

Under this system the work is supported by the collection of fees, thus entailing no expense to the state. The fees charged are 25 cents per carload for inspection, and a similar charge for weighing, being lower than is exacted for a like service in any other grain market in the country.

The Railroad and Warehouse Commission is also required to supervise the business of grain commission merchants, who are compelled to procure licenses from the commission before undertaking to transact business and to provide a bond with good and sufficient securities for the protection of persons making consignments. The commission has full authority to investigate the business of such commission merchants, with power to send for books and papers whenever complaint has been filed. This law provides an adequate penalty for infraction of any of its provisions.

The large quantities of land granted by congress and the state to aid railroad construction have, in the

MINNESOTA THE SPORTSMAN'S PARADISE.
Chicken Shooting in the Stubble.

main, been wisely used by the grantees, who have placed their lands on the market at reasonable prices, and by every legitimate means encouraged emigrants to settle upon them. From Scandinavia, Germany, Great Britain, Iceland, Finland, Russia, Holland, Poland and northern Europe generally, the railroad companies have brought hundreds of thousands of settlers and homeseekers of a most desirable class, who have made their homes in Minnesota and helped to build up the state. In doing so, there is no doubt the railroad companies made many sacrifices, but it has proved a good investment for them, as the enormous growth of railroad business indicated by the figures before given indicates.

In equipment, convenience and economy of operation, the railroad companies in Minnesota have kept well ahead of the times. For luxury and comfort no trains in the United States can compare with those running out of St. Paul and Minneapolis. The Pacific coast trains and the trains plying between St. Paul

and Chicago, and St. Paul and Duluth, are palaces on wheels, fitted with every modern utility. For freight traffic, the rolling stock on Minnesota railroads is superior to any in the country. The old-fashioned wooden box car, capable of carrying 20,000 pounds of merchandise, or 600 bushels of wheat, has given way to cars with three and four times their carrying capacity, and recently there have been brought into use cars constructed of steel, capable of carrying 100,000 pounds of merchandise, or 1,500 bushels of wheat. To haul a train of these immense cars the railroad companies employ enormously powerful locomotives of the most modern type, so that the number of cars in a train is almost as great as when smaller cars were used.

A list of the railroads in operation in Minnesota, with their mileage in the state, is appended.

## Miles of Main Track and Branches of Railroads in All States and in Minnesota, Exclusive of Trackage Rights, June 30, 1903.

| YEAR. | MILES. |
|---|---|
| 1862 | 10.00 |
| 1872 | 1,900.00 |
| 1882 | 3,332.93 |
| 1892 | 5,615.77 |
| 1903 | 7,250.01 |

| NAME OF RAILROAD | TOTAL MILEAGE | MILES IN MINNESOTA |
|---|---|---|
| Canadian Northern Ry | † | 43.70 |
| Chicago, Burlington & Quincy Ry | 8,095.69 | 23.61 |
| Chicago Great Western Ry | 846.18 | 145.62 |
| Chicago, Milwaukee & St. Paul Ry | 6,832.92 | 1,147.05 |
| Chicago, St. Paul, Minneapolis & Omaha Ry | 1,523.89 | 434.97 |
| Chicago & North-Western Ry | 7,327.38 | 650.30 |
| Chicago, Rock Island & Pacific Ry | 5,184.05 | 235.87 |
| Dubuque & Sioux City Ry. (Ill. Central) | 757.52 | 29.99 |
| Duluth, Missabe & Northern Ry | 161.33 | 161.33 |
| Duluth & Iron Range R. R | 209.54 | 209.54 |
| Duluth & Northern Minnesota Ry | 70.00 | 70.00 |
| Great Northern Ry | 4,814.90 | 1,832 25 |
| Iowa Central Ry | 502.27 | * |
| Minneapolis & St. Louis R. R | 631.73 | 378.61 |
| Minneapolis, St. Paul & Sault Ste. Marie Ry | 1,453.28 | 230.34 |
| Minneapolis & North Wisconsin Ry | 66.40 | 66.40 |
| Minnesota & International Ry | 146.67 | 146.67 |
| Northern Pacific Ry | 5,567.06 | 1,022.98 |
| Red Lake Transportation Co | 14.05 | 14.05 |
| Willmar & Sioux Falls Ry | 433.41 | 133.91 |
| Wisconsin Central Ry | 982.51 | 25.32 |
| Wisconsin, Minnesota & Pacific Ry | 309.25 | 247.50 |
| Total | | 7,250.01 |

† Not shown.
* No mileage in Minnesota. Line operated by M. & St. L. R. R.

GENEVA BEACH, ALEXANDRIA, MINN.

# MANUFACTURING.

By C. J. Whellams, Secretary Northwestern Manufacturers' Association.

The establishment of manufactories on the shores of the western world was contemporaneous with its earliest settlement. The artisan came with the trader, the agriculturist, the schoolmaster, and the preacher. Up to the time of the Revolution a large proportion of the colonial manufactures was the product of household industries. These industries gave employment to both male and female members of the families. Over a century ago, it is computed in a number of districts, "that two-thirds, three-fourths, and four-fifths of all the clothing of the inhabitants was made by themselves."

A few years since, the State of Minnesota was only a frontier state. But with the commencement of railroad construction the rapid growth of the Twin Cities commenced, and the birth of several towns throughout the state took place. After the Civil War and early in the seventies financial stringency was severely felt all over the country, which was disastrous to many enterprises. It forced into bankruptcy the St. Paul & Pacific Railroad, also prevented the building and extension of others.

This depression continued for several years, which retarded the development of the Twin Cities and towns on the lines of railroad. With the passing of the hard times emigrants poured into Minnesota, attracted by its soil and climate. The St. Paul & Pacific Railroad passed into other hands, who took hold of it with vigor, and the extension of various lines of railroad by other companies was pushed. It increased the settlement on farm lands (aided by the fertility of the soil), which produced good crops and created a demand for our manufactures to such an extent that new manufacturing industries were established and the growth of manufacturing throughout the state began to increase, so that to-day the State of Minnesota ranks seventh in prominence as a manufacturing state.

The last census returns show that the capital employed in 1900 was $165,832,246, distributed between 13,000 plants, large and small.

The manufacturers employed 77,234 wage earners, to whom they pay yearly the sum of $35,484,425 in wages.

The manufacturers pay over ten per cent of the whole assessed valuation of the state.

The manufactured products at the last census amounted to $262,655,881.

Its output is distributed wherever the American flag floats, and finds a market throughout the world, particularly its food products.

Its chief industries are the manufacture of agricultural machinery, boots, brick, biscuits, butter, cheese, carriages, crackers, cigars, doors, electrical machinery, electrical supplies, flax fibre, flour, fur garments, furniture, grass matting and mats, interior finish, iron from ore, lumber, linseed oil, men's underclothing, organs, overalls, packed hams, packed meats, packed bacons, pressed metal, sleighs, shoes, stone,

sash, shirt waists, structural iron, tinware, twine, women's underclothing, wagons.

The greatest number of manufacturing industries are to be found in Minneapolis, St. Paul, Duluth, Red Wing, Faribault, Winona, Mankato, Stillwater, Sauk Centre, Owatonna, Rochester, New Ulm.

With the extension of the rapid settlement of the northwest, and the extension of the railroad to the Pacific ocean, and the area that has and will become productive through irrigation, and the country tributary to Minnesota, opened up a home market and created a demand for the various manufactured products of the state, it increased the demand for goods to such an extent that the capacity of the present manufacturing plants is not adequate to meet the demand. Capital can secure seven to eight per cent interest on preferred stock in many of our old established factories. To the north lies the great Canadian Northwest, which is fill-

A FAVORITE HOLE, FISHING FROM CANOE.

ing up so rapidly with settlers that under reciprocal treaty a trade might be obtained for the State of Minnesota, that would become equal to the home trade already obtained. Our enterprising citizen, Mr. J. J. Hill, is providing traffic communication by land and sea, that with the completion of the Panama canal should enable this country to secure some of that large volume of business in the Orient now being done with European countries.

Situated as the State of Minnesota is to the Pacific Ocean, it is only fair to assume that its enterprising manufacturers will seek to do business there, also with the Australian Colonies and South America. It must be apparent that the State of Minnesota presents unusual facilities for the growth and development of manufacturing industries, and at the present rate of progress it will not be many years until, instead of ranking seventh as a manufacturing state, it will take a middle place. Its large ore deposits will attract the iron-master, and instead of the ore being taken to the smelter, smelters will be built near the ore, and the

coal will be brought to them to keep them running. Its furnaces may rank in a few years the largest in the country, if not in the world.

The manufacture of grass mats and matting from grass that for years had gone to waste is a new important industry and is a source of considerable income to the farmer. As manufacturing advanced more labor was employed in the factory, and created a large demand for the products of the farm, securing to the farmers of Minnesota a reliable and profitable market. Thus the price of farm lands has increased, so that the purchase of farm lands and the settlement on homesteads during this period has been very considerable.

Its healthy climate and exceptional opportunities make the State of Minnesota a very desirable place to live in, profitable to the farmer who secures lands, as also to the manufacturer who starts a manufacturing industry. Agriculture and manufacture are the backbone of the state; by their united efforts it is being built up, increasing the value of all property in city, town, and country.

# MINING.

By Dwight E. Woodbridge.

Minnesota is the chief iron mining state in the Union, mines more ore than any nation on the globe excepting Germany, and may pass her also in a few years. Minnesota is the mainstay of the steel industry of the United States, and how important this is to the country none need be told. It is from Minnesota ore that are constructed the vast upspringing arches sustaining the roofs of the great city buildings; Minnesota ore made the steel that has linked Russia with the far East, that built the viaducts spanning chasms in India and Asia, the battleships that carry the name of this country over distant and storied seas; in short, it has made possible those splendid triumphs of peace and war accomplished by the United States in the last great upward movement of our nation.

And Minnesota as a mining factor was not known two decades back; its share was unimportant within 10 years. In 1900 it produced 49.6 % of all iron ore mined in this Lake Superior region; in the next year its proportion was 52.4; in 1902 it was 55.3, and in 1903 this new state furnished 59.7 % of all iron mined in this overwhelmingly important Northwestern mining district.

This portion of the United States called the "Lake Superior region" is pre-eminent as a source of supply for iron ores of purity; not only this, but it is the only American district that furnishes ores in considerable quantity of the character required in the manufacture of bessemer steel. While a notable improvement has taken place lately in the favorable recognition of open-hearth steels, they are still a minor factor in the tonnage of steel products, and will probably continue subordinate so long as ores for the bessemer process

are plentiful and cheap. More than 75 per cent of all iron ores used in America are mined along the shores of Lake Superior, and far more than 75 per cent of the iron and steel made in this country is from these ores. They are uniformly purer than those mined elsewhere, so a ton of standard lake ore will make nearer a ton of pig iron than the same quantity of standard grade ore from any other district of the United States. The iron ores of the "eastern district," New York, New Jersey, Pennsylvania and Ohio, vary from 35 to 53 per cent in iron, so that it takes about two to three tons of ore to make one ton of pig iron. The ores of the South, Alabama, Tennessee and Georgia, are still leaner and more earthy. In the Lake Superior region, up to a year or two ago, nothing was considered merchantable ore that did not assay better than 60 per cent, and the average of shipments was higher than that. Indeed, ores of a character that would be considered excellent in the South and East were used for ballast for roadways. Now, however, there has been a slight change, and ores running so low as 55 per cent are shipped. But these are in the minority, and the average of the region is still about 60 per cent. The highest grades of Lake Superior ores to be shipped in quantity are those from Minnesota mines, on both the Vermillion and Mesaba ranges.

It has been due to the wonderful deposits of the Mesaba range that Minnesota has sprung so quickly to the front. It is the most remarkable iron ore region, both geologically and commercially, that has come to the knowledge of man. It has been almost solely responsible for the great development of the steel industry in the past few years; to it has been due, more than to any other single underlying cause, the necessity for the formation of the world's largest and most important aggregation of capital in manufacturing industry; and it has made the harbor of Duluth-Superior one of the chief points for origination of water-borne commerce.

In the year 1903 the commerce of the Duluth-Superior harbor, whose weight consists very largely of iron ore and associated products, was reported by the United States government to amount to 23,000,000 tons; during the same time the commerce of New York and its sub-ports amounted to 30,000,000 tons, that of Philadelphia to 21,000,000, and of Boston to about 20,000,000. None of these figures include commerce entirely within any one of the districts. It is reliably stated in most recent statistics that the commerce of the head of Lake Superior, passing under the distinctive name of "the port of Duluth," was fifth among the great maritime cities of the globe. It has been iron ore that has given it this distinction. For ore, while it is not of high monetary value per ton, exceeds in weight any other article moved upon the great lakes, and the point from which the most ore is transported leads in importance of its tonnage.

It is a remarkable distinction thus given the interior ports on Lake Superior, ports open for com-

merce but eight months of the year, and generally considered as points of somewhat minor importance. That it is remarkable no one can fail to appreciate who realizes the youth of the Northwest, and the intense commercial activity, the veritable armies of men and the modern and costly terminal facilities, arranged with the utmost refinement of labor-saving devices, that are required for handling such a traffic, compressed into the brief two-thirds of a year. It was only 50 years ago that the first ships passed through the St. Mary's canal and ruffled the depths of the upper lake, and men are still in the prime of life who had charge of the earliest vessels that brought settlers to hew out an abiding place and homes at the western end of Superior.

One cannot realize the importance of the iron ore business of the Lake Superior region, and of Minnesota, nor the advances that have been made recently, until he gives the subject study and compares the present state of the industry with that of previous years and with that of other iron-producing districts in this country and Europe. During the past 50 years the United States has risen from a position of absolute dependence upon the old world for its iron supplies to that of the largest producer in the world and an enormous exporter. The first shipment of iron ore from Lake Superior was made in 1850, and consisted of 10 tons. This was hauled around the rapids of Sault Ste. Marie, at the lower end of Lake Superior, on a little strap railway. Unloaded from toy vessels above the rapids, it was reloaded below them into others almost as tiny. The first use of Lake Superior ore in a blast furnace took place in 1853 in Pennsylvania, when about 70 tons, brought at great expense from Lake Erie by canal, were used in the Sharpsville furnace. The first pig iron made in the Lake Superior region was in 1858, in a small furnace near Marquette. It was not until 1890 that the United States passed Great Britain in the manufacture of pig iron, and since 1896 it has maintained this position, producing in 1903 18,009,000 gross tons, while Germany made 10,085,000 tons and Great Britain still less. It was in 1867 that the Bessemer process was developed so that steel rails were available for commercial uses at prices that were at all possible. In 1869 the production of rails was 8,616 tons and the cost was $132 a ton. In 1901, 32 years later, the production of rails had mounted to 2,870,810 tons and the price had dropped to $27.33 a ton.

Since the commencement of iron mining on Lake Superior we have shipped 244,000,000 gross tons, of which half has been produced and consumed industrially in the last seven years. Three-fourths of the quantity, so incomprehensibly vast, is the work of 13 brief seasons. It took all the years from 1850 to 1886 to find a market for as much ore as was required in 1903 alone.

The existence of iron ore in Minnesota has been known for the past 50 years, but no serious and sustained attempt at its examination was made until the

MEMORY OWEN

'70's, and the first actual mining took place in 1884. Then the Duluth & Iron Range road was completed from Lake Superior to mines on the shore of Vermillion lake, about 70 miles inland. The Minnesota Iron Company was formed and in that year shipped a small amount of splendid high grade hard ore, the first to go out of the state, and the initial trickle of what is now a splendid flood of traffic. The road has increased its business constantly, until it is now of enormous proportions. The production from mines to which this railway was originally built was in 1903 just 3 per cent of the ore business of the road. This fact is an interesting commentary on the crudity of ideas of the iron trade of Minnesota and the Northwest entertained 20 years ago by those who were its leaders and its most courageous pioneers. And when that road was constructed and the daring adventure was successfully made, there was no thought that other and far larger deposits lay contiguous, or that any other business might be secured. The Duluth & Iron Range was the first, and for many years the only, iron ore road in the state.

In 1890 the Mesaba deposits were found by men who knew the value of iron, and what it might mean to the state and nation. Innumerable were the hardships of early explorers, as they are in every new district; but development was exceedingly rapid, and in the fall of 1892 there was a railway to the Mesaba. It hauled out one trainload of ore before winter set in that year, and that was sent, as a trial shipment, to an Eastern furnace. Since then there has been a constant and steady growth, until last year the Mesaba range shipped 52.8 per cent of all ore forwarded from the Lake Superior region. When the Mesaba was first opened it was generally supposed, and particularly by those interested in other fields, who feared its cheap mining and vast stores of ore would make valueless all other districts, that but a very small percentage of its peculiar ores could be used in the blast furnace charge. This was on account of the fact that these ores, instead of being hard and granular, like those of most of the other regions, were fine and in some cases dustlike. They packed in the furnaces and occasionally caused dangerous and even fatal explosions. But under the stimulus of low costs for these ores the difficulties have been overcome, and their use has rapidly extended, until to-day more than half the steel made in the great centers of Pennsylvania, New York and Ohio is from ores mined upon the Mesaba range. It was only after strenuous campaigns of education, of costly experiment, through serious financial difficulty and at the risk of worse, that the steel makers of the iron centers of America were induced to favor the new district, and the struggles of those early days are little appreciated by any not intimately associated with them. These demanded the broad view of men of affairs, the faith in future growth and development of the iron trade that was lacking in many quarters during the trying days of 1894 and 1895, an abundance of

ready funds, a belief that apparently insuperable obstacles could be overcome and that new and untried methods must win, and, finally, a faith in the ultimate full acceptance of value in ores of the new and then unsatisfactory character of the Mesaba deposits.

These Mesaba mines are the most wonderful that have been opened anywhere on the globe. Instead of lying nearly vertical and running to great depths, they lie in beds at an average dip of not more than eight degrees. Instead of being inclosed in rock of the hardest kinds, they are covered by glacial drift, gravel, boulders, clay and swamps, and there are comparatively few feet of these materials over any of the mines. And all these points of difference mean but one thing—less cost of winning the ore. Less cost means cheaper steel, and cheaper steel means the further extension of its uses and of the domination of the United States over the industrial activity of the world.

Iron ore shipments from Lake Superior for the past two years have been as follows, the figures being in long tons of 2,240 pounds, which is the ton exclusively used by mining companies and buyers:

| Range | 1902 | 1903 | Decrease | |
|---|---|---|---|---|
| Mesaba | 13,342,840 | 12,892.542 | 449,298 | 3.4 |
| Menominee | 4.627,524 | 3,741,284 | 886,240 | 19.1 |
| Marquette | 3,853,010 | 3,040,245 | 812,765 | 21.1 |
| Gogebic | 3,663,484 | 2,912,912 | 750,572 | 20.7 |
| Vermillion | 2,084,263 | 1,676,699 | 407,519 | 19.5 |
| Michipicoten | 298,421 | 201,057 | 97,364 | 32.5 |
| Totals | 27,869,524 | 24,482,642 | 3,386,882 | 12.2 |

That there was a decrease in the total shipments of the year is a fact the reasons for which are not far to seek; the public knows of the brief but tremendous shrinkage in the volume of steel trade during the closing months of 1903. But while other lake ranges reduced their output about 20 per cent, the diminution of the Mesaba was less than 4 per cent. And it is a safe prediction that the proportionate shipments from this wonderful deposit of rich iron ores will continue to increase, in good times or dull, for many years to come.

Total shipments of iron ore from the Lake Superior region for all time since mining commenced there have been as follows, with the proportionate quantities of the several districts:

| Range | When Opened | Total Shipments | Per Cent |
|---|---|---|---|
| Marquette | 1850 | 69,800,898 | 28.6 |
| Mesaba | 1893 | 66,576,771 | 27.2 |
| Menominee | 1877 | 45,918,499 | 18.8 |
| Gogebic | 1884 | 40,646,454 | 16.6 |
| Vermillion | 1884 | 20,738,250 | 8.5 |
| Michipicoten | 1900 | 794,645 | 0.3 |
| Totals | | 244,475,517 | 100.0 |

The Marquette range, with its 53 years of growth, has mined but 1.4 per cent more than the Mesaba, not yet in its teens. No other lake district has approached the record of the Minnesota range. The present year will put the latter far ahead of any of its adjacent districts, and the passage of years will but increase its lead.

Though there has been a considerable decline in ore mining since 1902, the average of growth for ten-year periods has been in the neighborhood of 300 per cent. For decennial periods since the industry became of importance the figures are as follows:

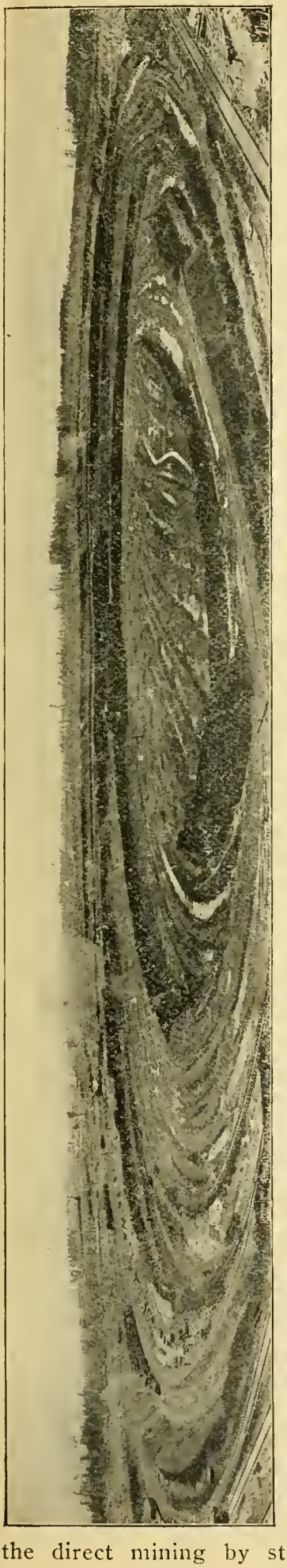
| Year | Tons Mined |
|---|---|
| 1864 | 247,000 |
| 1874 | 900,000 |
| 1884 | 2,500,000 |
| 1894 | 7,750,000 |
| 1903 | 24 500,000 |

The great increase of tonnage in 1902, when shipments reached 27,500,000 tons, was out of line with the average growth, and the following year brought things to their even keel again. If the steadiness of this constant and wonderful increase means anything it indicates that the ratio in future will be fairly conformable to rule and that, while no such rise as 300 per cent every decennial period is probable, or possible, it will be large. Had it not been for the discovery of the Mesaba range no such expansion as has taken place in the past few years would have been possible. Indeed, were it possible to conceive this range now eliminated, no more material calamity could befall the United States, which would at once retire from her proud position as chief arbiter of the steel trade of the world. Without the Mesaba there could not have been produced the necessary amount of high grade ore to have met the requirements of America and the demands of export trade that has come up so rapidly of late. It is a question, indeed, if enough iron could have been mined to meet home demand. If this requirement might have been met without the Mesaba it could only have been by the use of far leaner ores than have now been necessary. These would have so far increased costs that the people of the United States could never have reached their record-breaking consumption of the present.

The Mesaba is not only the largest producer, but it contains the biggest mines to be found. It has several that are limited in their annual capacity only by the demands of the steel trade and the ability of railways to take away what they mine. Mines on the Mesaba have produced as much as 15,000 tons a day, for weeks together, and might maintain this extraordinary production for entire seasons could railways, ships and receivers care for the avalanche of tonnage. Last year there were 15 mines on Lake Superior that produced more than 500,000 tons each. Of the 15, 10 were in Minnesota and nine upon the Mesaba range. Up to 1894 there never had been a mine in the world that had produced as much as 500,000 tons in a single year.

With its ore lying near the surface of the ground and somewhat horizontal of dip, Mesaba mining methods have been revolutionary. The bulk of its ore is taken from mines that have been "stripped" of the overburden of sand, gravel, boulders and rock before the process of actual mining is commenced. This stripping is usually done by powerful steam shovels,

and is simply a rolling back of the glacial drift, etc., overlying the thick blanket of ore. These stripped mines are of two classes. First, those in which the machinery used for winning and removing the ore consists simply of a great steam shovel and a train of standard gauge cars upon a main line track; and, second, those in which the ore is first dropped or "milled" down, then trammed to shafts and hoisted as in the ordinary manner of mines. Either is of tremendous advantage over underground methods, of whatever character. By either mining costs are reduced to such extent that owners of these mines are independent of competition. In the second class of stripped mines, those whose process is called "milling," there is a combination of the underground and steam shovel processes of a most ingenious character. Modifications of both these devices for mining, such as have suggested themselves through the character of the ore bodies or the inventiveness and originality of managers, are constantly in play. In either the tonnage produced is something so great, per man per day, as would give the writer, should he quote figures, an unenviable reputation among mining men unaccustomed to these regions. This product is greatly increased by the character of the ore itself, which is of so soft a nature that much of the drilling is done by hand augers at a rapid rate, and which permits the direct mining by steam shovel with no more explosives than are required to simply loosen the



THE MAHONING MINE, HIBBING, MINN.

ground by heavy charges of black powder; indeed, in many mines even this is neglected and the shovel works against a bank of ore that has never been disturbed since it was originally formed there in place.

Seventy-five thousand people in northern Minnesota, chiefly in St. Louis county, are directly supported by the mining of iron ore. Aside from these, a very large part of the population of the thriving and growing city of Duluth depend either directly or indirectly upon the same industry. The benefit of this industry extends throughout the farming communities of Minnesota and adjacent states in wide and beneficent streams, making a home market for a vast volume of produce and supplies which cannot be grown among the mines. It will not be out of the way to estimate that nearly 250,000 persons in Minnesota derive at least a considerable portion of their support from the operation of these great mines. Even from this materialistic standpoint the continued and successful operation of these mines is a national blessing. During the year 1903 their payrolls contained the names of about 18,000 full-time men, and the rate of wage was higher than that of any similarly skilled classes of labor throughout the state. At the same time more than 4,800 men were employed on the ore-carrying railways of St. Louis county. Not far from 5,000 more gain their livelihood on ships employed almost exclusively in the ore trade. This is an army of wage earners of the highest type that means something definite and inspiring and stands for the development of a great region.

Hibbing, Eveleth, Ely, Tower, Virginia, Soudan, Sparta and half a dozen other towns of from a few hundred to 10,000 inhabitants, all bear the stamp of energy, ability, faith and funds. All have schools that would do credit to any city in the Union, and this is said without fear of contradiction. Statistics show that the pay of teachers in the range towns and villages averages higher than in any other country districts in this broad land of universal education. These towns have hospitals as modernly equipped as those of the finest clinic of the universities, and in them all are to be found the same refined comforts of civilized life that are usually associated only with centers of larger population. The mining companies have striven to make life pleasant; their locations are models of comfortable, cleanly and attractive homes. It is probable that in no distinctively mining region are the amenities of life so generally observed as in these mine cities and locations in Minnesota and other regions about Lake Superior. There are none, most assuredly, where miners are so contented, so prosperous and so

AT THE MINES.

forehanded, where strikes and labor troubles are so rare and where the relations of employer and employed are so agreeable.

Minnesota iron ores reach the East by a system of transportation that is not surpassed for economy of operation and excellence of results. From the time the shovel of the open pit mine or the skip of the deep underground property drops its load of ore into a car, human hand does not touch it until lower lake ports are reached. With improvements now going on at receiving points, unloading there is to be largely automatic, and from the time ore leaves the mine till it comes from the steel finishing mills its passage is practically mechanical throughout. The cars carrying ore from mines to Lake Superior ports run onto elevated docks and are of hopper bottom construction, so that the ore is dropped from them into great triangular pockets. Here it lies until a ship comes alongside, when a shute is lowered into position, a gate in the lower point of the pocket is opened and the ore slides on by gravity into the hold of the great vessel. Her cargo loaded, the ship leaves port and in a few days arrives at some Lake Erie receiving port, where she is placed under a tremendous unloading machine of one of some half-dozen types. Some of these have now been perfected to such an extent that the entire cargo is taken out without human aid, and the arduous human labor of the swarthy ore shoveler is eliminated from the economy of the trade. Five and six thousand tons of ore are taken from a ship by two machines in four or five hours at a cost of less than five cents per ton. The entire charge against ore from the time it leaves the most inaccessible mines on the most distant Lake Superior range till it is in cars or on stockpile at some Lake Erie port is less than $1.80 a gross ton, and this includes two handlings, more than 100 miles of rail haul and 1,000 miles of water transportation. These figures of low costs are equaled nowhere else. Water transportation has been so perfected that vessels of the great lakes make large profits at a rate of freight amounting to less than one mill per ton mile, which is lower than any similar rate made regularly in any part of the globe.

There are three great railway systems engaged almost exclusively in handling iron ore from Minnesota mines to Lake Superior terminals, these latter being on the harbor front of Duluth-Superior and at Two Harbors, sub-port of Duluth, a few miles down the north shore of Lake Superior. These three roads moved during the season of 1903 14,500,000 tons of ore, in round figures. Their shipping season begins in April and ends in December, with the close of navigation on Lake Superior. It is a brief year, and the volume of traffic that is compressed into a few months is of enormous amount. These three railways are the Duluth, Missabe & Northern, the Duluth & Iron Range and an important branch of the Great Northern Railway. It is probable that for many years the Duluth, Missabe & Northern will lead in the gross volume

of business, as it taps a district that contains a great quantity of easily mined ore of the character most in demand, and as it supplies customers whose requirements are large and fairly constant.

These roads are all provided with the most elaborate and complete equipments of rolling stock, motive power and terminals, the latter largely of special design, adapted solely for their peculiar business. Their ore cars are mainly of steel, carrying from 100,000 to 112,000 pounds each; their locomotives are the most powerful in use in America. Their terminals include vast ore docks erected for their special purpose at great cost and under the supervision of the highest engineering skill. The demands upon an ore dock are particular and intricate. It must be so high above water that the largest lake ships can lie under its side and receive ore from the bottom of its pockets by gravity; in other words, the bottom of its pockets must be elevated about 40 feet from water level, and the entire weight of load must be carried above that height. The docks must have capacity for 50,000 to 90,000 tons of ore in these pockets, must be strong enough to permit the free movement of great engines and trains of loaded cars upon the upper floors, perhaps 75 feet above water and 95 or more from the ground. The largest, highest and most capacious docks in the world are those at the head of Lake Superior. Those of the Duluth, Missabe & Northern have two and one-half miles of loading frontage in three piers. Two of the three are a half mile long, and are equipped with pockets and loading devices upon either side. One pier belonging to the Great Northern system is the highest and widest dock ever built for this traffic, with capacity in its ample pockets for the storage of 90,000 tons of ore at one time.

The annual cost of administering the affairs of the great commonwealth of Minnesota, with all its departments and bureaus, its institutions for higher education, its various penal establishments and its broad and liberal charities, is in the neighborhood of $2,500,000 a year. Of this these three iron ore roads, handling one kind of freight almost exclusively, and confined to one corner of the state, to one county, indeed, pay fully $425,000. They pay nearly one-third of all taxes of all its railroads, including the many great lines centering in Minneapolis and St. Paul. These are astonishing comparisons, but they are the simple facts. And these railway taxes are but a minor portion of the money flowing into the public treasury from this single industry of mining in St. Louis county. The mines themselves pay taxes amounting to about $600,000 per annum. Thus more than $1,000,000 a year is directly derived from this single productive enterprise for the support of the commonwealth, the county, the city, the village. How much more is paid by those more or less directly supported by the industry it would be difficult to estimate.

One of these iron ore roads has the reputation of a greater density of traffic than any other road in Amer-

ica, probably than any in the world. Its trains thunder down the grades from mines to Lake Superior, following each other at the rate, in the height of the season, of 27 to 30 every 24 hours. Their revenue producing train loads are as high as from 2,000 to 2,200 tons. They are built with 80 and 100-pound steel rails, and their standard of maintenance is as high as any in America. And not only in a material way, but in an ethical way, they are models. It is claimed that in no other terminal railway town of like size as Two Harbors are there so many men with bank accounts and owning their own homes. That the same is not true of the terminal of the Duluth, Missabe & Northern road is due simply to the fact that this road is younger than the other. Both roads have cared for their employes as far as is consistent with good business policy in the contributions to public schools and otherwise, and both have erected and endowed large and complete halls, reading rooms and Y. M. C. A. buildings.

The connected ownership of mines, railways and steamships is of the utmost importance in the economical conduct of the entire business. Only one large mining company in this state, the United States Steel Corporation, has all three, though several large concerns have both mines and ships. The great lakes ore trade is chief among the various branches of commerce carried on along the northern lakes. Out of 37,675,000 net tons of freight carried through Lake Superior in 1903, 21,654,000 net tons were iron ore, and the ore proportion of the previous year was even larger. More than 300 modern steel ships of the largest size and most powerful equipment are engaged in this traffic. Their average size of newer ships in this trade gives them each a capacity for about 5,000 gross tons, and there were 5,000 such cargoes delivered from lake ports last year. At the docks of the Duluth, Missabe & Northern road last year the average weight of cargo taken was 6,000 gross tons, and at those of the Duluth & Iron Range and Great Northern the figure was nearly as high. At no other ports on lakes or oceans were the tonnages so great.

The value of iron ore depends upon three characteristics: First, quality; second, accessibility, and third, quantity. It has been shown above that there is no ore mined in the United States that can compare with that of Minnesota; nor in Europe are there many districts of as high grade. The Swedish Lapland mines of Luossavara produce a magnetic ore of as high, or higher grade, but magnetite is not so favorably regarded as is the hematite universally produced on Lake Superior. The Cleveland district is the most important in England; its ore averages 33.5 per cent iron and .812 per cent phosphorus, making it too impure for the bessemer process. White Haven furnishes an ore averaging about 54 per cent and Ireland one averaging nearly 40 per cent. Spanish ores are excellent and average perhaps 58 per cent; the ores of Belgium contain from 30 to 45 per cent iron, those of Germany from 30 to 40 per cent, Elban from 50 to 60

per cent, and Russian about the same. Minnesota ores that run under 60 per cent are called low, and a few points poorer and they are not available for shipment. As to accessibility, there are no mines in the world whose transportation to points of consumption is at so low a price as those of Lake Superior; water freights and the ingenuity of American industrial leaders have accomplished that. Accessibility includes also ease of production, and in this the giant Mesaba mines have no equals. In point of quantity the Mesaba is, as has been pointed out, far above any known district. At the present time some 70 mines have been opened in a stretch of 50 miles, and many more have been discovered and are waiting only the proper time for their development. It is impossible to make any estimate of the amount of ore known to exist in northern Minnesota, but that it will supply the steel trade of America for many years there is no question, while there is a large amount of land that has not yet been explored.

But all this ore will be required, and the value of reserves in the ground is continually increasing and becoming better recognized, to the advantage of the commonwealth and all its citizens. At no other period of our history as a nation has steel entered so largely into our daily life as a prime necessity of existence. Never has it formed so large a proportion of the details of common uses of construction. There seems no limit yet in sight to the multiplying uses to which iron and steel can be put. Their consumption per capita in the United States has gradually increased, until in 1903 it amounted to 450 pounds. No other nation approaches this quantity. The consumption of the world is but 20 pounds per inhabitant. As our own, and as the consumption of the world grows, the demands on Minnesota will increase in rapid ratio, and the annual production of mines upon the Mesaba and Vermillion ranges will doubtless be largely increased.

A FINE STRING OF BLACK BASS.

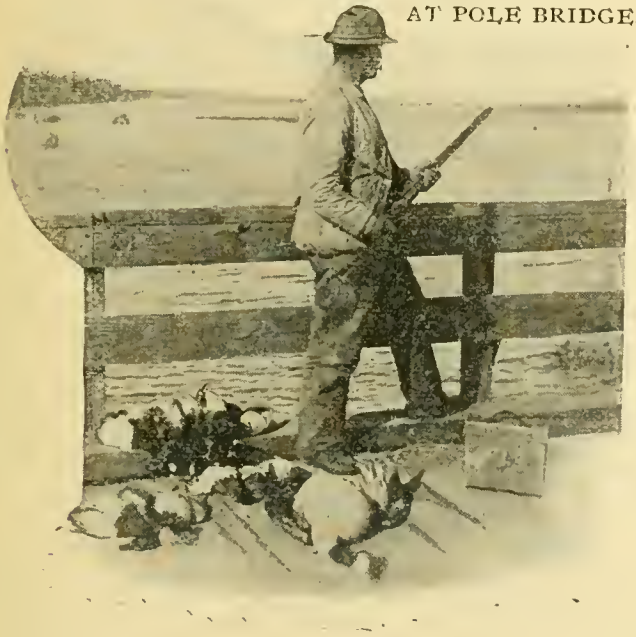
# MINNESOTA A SPORTSMAN'S PARADISE.

By Wallace B. Douglas, Associate Justice of Supreme Court.

A primeval forest in the north, and ten thousand beautiful lakes scattered throughout its domain, appeals strongly to those who know the difference between rifle and shotgun, and to whom the click of the reel is familiar music. Here changing climatic conditions in mid-summer and early fall speak silently to young and old, as well as to the over-worked, and tell tales of pleasure and rest which are usually the subjects of dreams.

Comfortable hotels in hundreds of picturesque nooks, upon lakes teeming with bass and pike, and accessible to well equipped lines of railway, bid the traveler welcome; while deeper in the wilderness of pine or hardwood, by a rushing trout brook, toward which the trail of deer are well defined, may be found

SPORT ON THE PASS AT POLE BRIDGE.



the cabin of a pioneer or hermit hunter or trapper. Experience tells us his "latch string is always out."

In these nooks and by-places,

"When round the lonely cottage
Roars loud the tempest's din,
And the good logs of Algidus
Roar louder yet within,"

"o'er true tales" are constantly being told, differing sharply from that of how "Horatius kept the bridge."

From this land of sunshine, forest and plain the bison and elk have gone, and caribou are practically extinct, but moose and bear in limited numbers, and white-tail deer in abundance, still cling to their favorite grounds upon the fringe of civilization in the north. A fair idea of the vastness of this area, where big game abounds (which forms but a small part of Minnesota's park region), may be gotten by noting that it is greater than New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island combined.

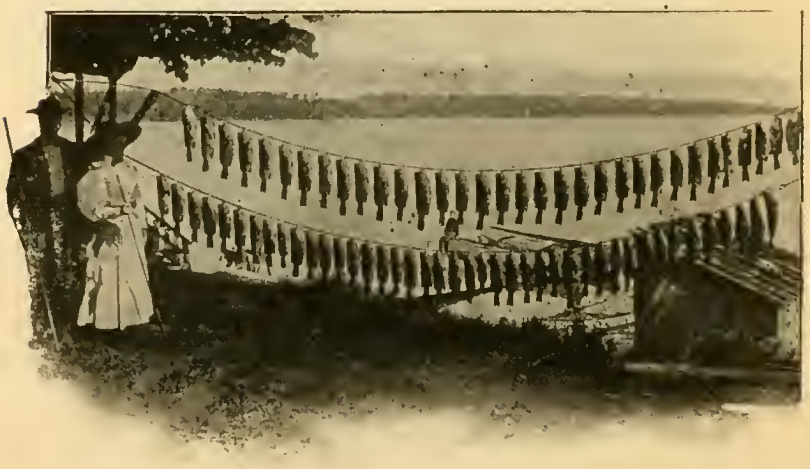
Originally Minnesota was in the direct path of a large portion of the northern and southern flight of aquatic fowl, and thousands of wild geese and ducks

still annually tarry here en route to or from their breeding grounds in Manitoba, Assinaboia and the great tundra country of Alaska. Ours is the natural breeding

HOOKED BUT NOT NETTED.

ground of many varieties of wild duck. The Canada goose also nests with us, and, thanks to the abolition of spring shooting and the enforcement and respect paid to the laws, they are again nesting here in rapidly increasing numbers, notwithstanding the fact that the northern flight has of late years been driven westward.

If the people of the south who love the great "outdoors," and that which entices them there, will follow the example of Minnesota, Manitoba, Assinaboia and Congress — speaking for Alaska — and prohibit the shooting of aquatic wild fowl between December 1st and September 1st following, the west and south will profit by the dearly-bought lesson taught the east and southeast, where practical extermination has long since existed. This is the natural habitat of the short-tail grouse, prairie chicken, partridge, woodcock, snipe of various species, and changing conditions have brought us the eastern quail; while respect for the law promises to preserve them for future generations.



GENEVA BEACH, ALEXANDRIA, MINN.

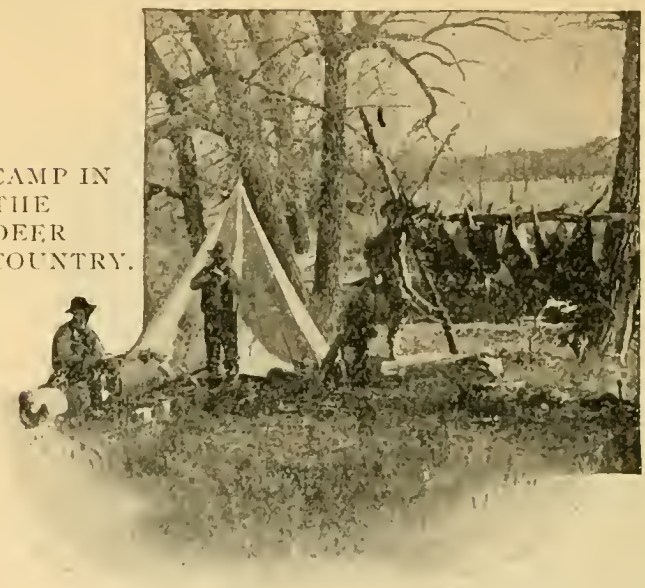
In the future, from a sportsman's or tourist's standpoint, when game as a whole must diminish, the wealth of Minnesota will lie in its lakes and fish. Our ten

PRAIRIE CHICKENS IN A STUBBLE FIELD.

thousand lakes exceed in number, as well as in proportion to area, those of any state in the Union, and are scattered generally throughout the state, as well upon the prairie as in the timber or park region. The water is usually deep, their banks well studded with timber, and, as a whole, they are picturesquely adjusted to the landscape. They are from one to over 100 miles in circumference and abound with the highest type of game fish, including Oswego, or small-mouth bass, black bass, muskalonge, pike, pickerel and croppy.

Minnesota is maintaining two large fish hatcheries and breeding successfully brook trout, pike and some other species of game fish. With this advanced policy as to fish propagation, the least sanguine of our Isaak Waltons knows that the hereditary instinct of those who

follow them in future generations will be encouraged. Tributary to Park Rapids the state is maintaining, as a game preserve, a state park containing upwards of



CAMP IN THE DEER COUNTRY.

25,000 acres, which includes the headwaters of the Mississippi river. A park commissioner is in charge to entertain the visiting public, and a large, artistic log cabin, for a like use, is in course of construction in a beautiful forest of pine upon the shore of Lake Itasca.

Special accommodations are provided to lovers of forest and stream at innumerable places, among which may be mentioned: Osakis, Alexandria, Annandale, Walker, Bemidji, Cass Lake, Detroit, Ortonville, Taylors Falls, Fairmont, as well as at Lakes Miltoona, Milaca, Womans, Prior, Howard, Minnetonka and White Bear.

Tributary to Duluth, upon the north shore of Lake Superior, which is studded with palisades of rock and fir tree, hundreds of picturesque summer camping grounds may be found. This shore, with its cool and invigorating climate, easy of access to civilization by daily boat, tributary to lake and brook trout fishing of the highest order, is little known to the people of the country, but those who have once visited it have thereafter been its most ardent admirers; while the trip to and around Isle Royal is one of the most enjoyable in northern travel.

PRETTY GOOD LUCK ON THE MARSH.

MINNESOTA

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